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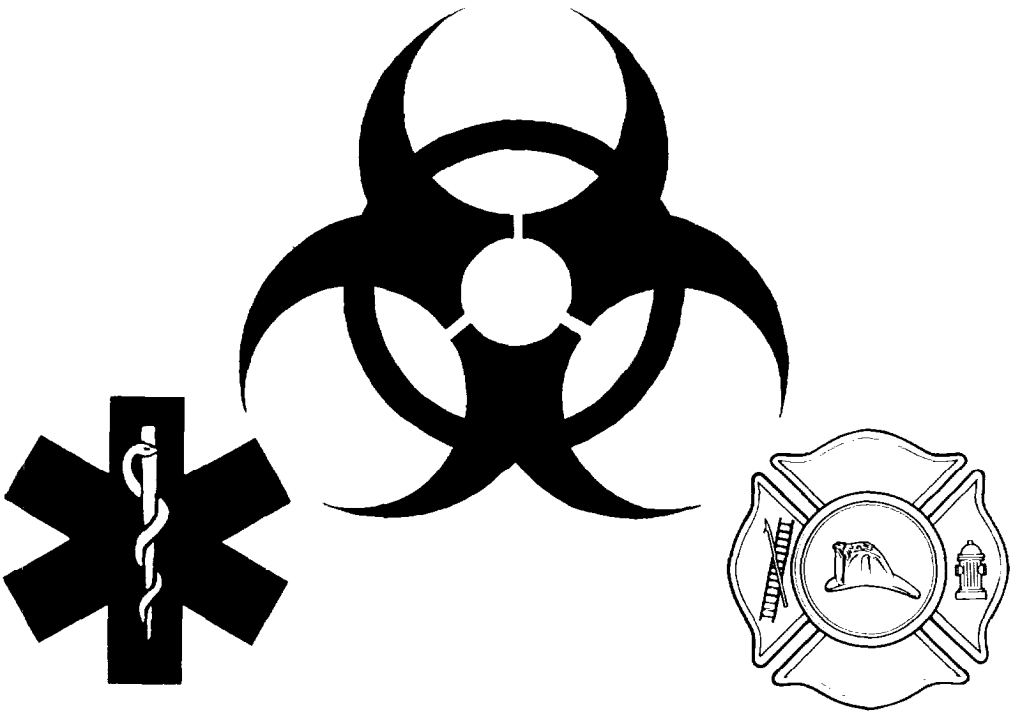
GUIDE TO DEVELOPING AND MANAGING AN EMERGENCY SERVICE

INFECTION CONTROL PROGRAM



1992

UNITED STATES FIRE ADMINISTRATION

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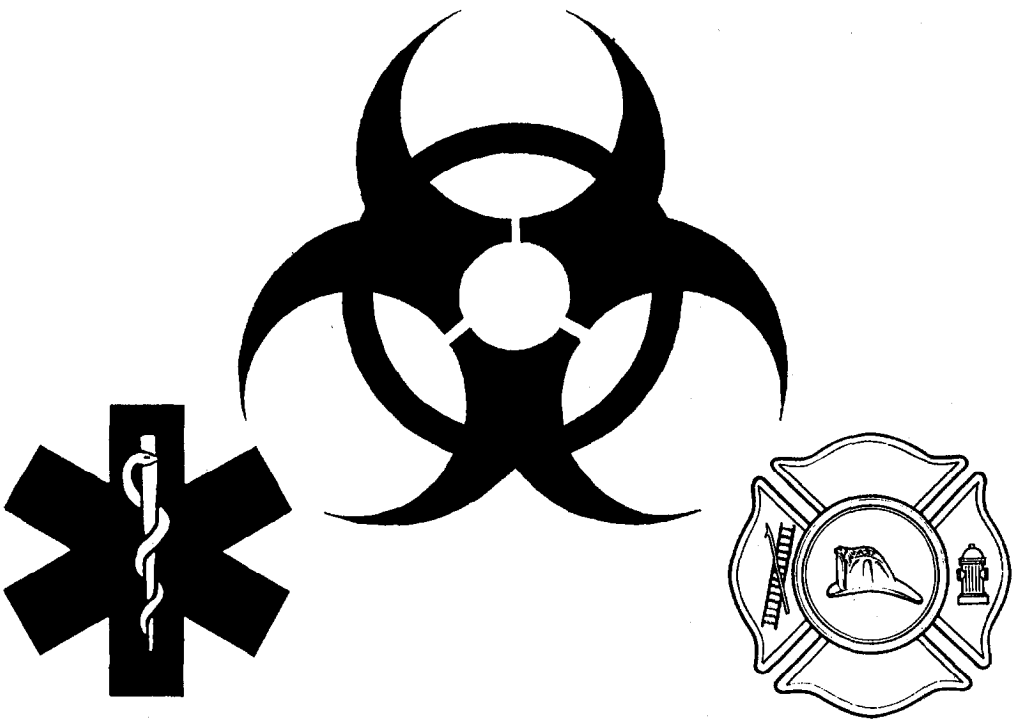

1992

UNITED STATES FIRE ADMINISTRATION

Federal Emergency Management Agency
United States Fire Administration
Emmitsburg, Maryland 21727

Dear Colleague:

Since its inception, the United States Fire Administration (USFA) has been committed to enhancing the health and safety of emergency response personnel. Fire, rescue, emergency medical service, and other emergency response agencies across the country rely on the USFA for state-of-the-art information on critical emergency management issues. Thus, some of our most aggressive initiatives in recent years have focused on the very real and serious threat of occupationally acquired communicable diseases.

Emergency response personnel routinely face potential exposure to debilitating, and sometimes life-threatening, communicable disease. Opportunities for the transmission of disease abound in the emergency response work environment, both on the scene and in the station. Thus, preventing the transmission of infectious and communicable diseases through effective infection control is a priority concern in all emergency response organizations.

In an effort to address the myriad of emergency service communicable disease issues, the USFA sponsored a "Forum on Communicable Diseases" in both 1988 and 1989. Experts from the Fire and EMS fields, physicians, attorneys, infection control experts, and allied Federal Agency representatives gathered to identify specific recommendations for minimizing the effects of communicable diseases on emergency service operations and management. In response to forum recommendations, the USFA conducted or co-sponsored national teleconferences on infection control in 1989, 1990, and 1991. In addition, the USFA and the National Fire Academy (NFA) initiated a joint effort to implement two other major recommendations--development of an NFA field course on infection control and publication of an infection control program guide for emergency Service managers.

This Guide *to Developing and Managing an Emergency Service Infection Control Program* is designed to assist emergency managers in establishing an effective infection control program within their organizations. It will serve as a valuable resource to those managers Seeking a clear understanding of communicable disease issues and will facilitate compliance with current laws, regulations, and standards related to infection control in the emergency services.

The USFA is committed to assuring the health and safety of all emergency responders by minimizing potential occupational exposure to communicable diseases. To this end, we will continue to work closely with the Centers for Disease Control, the Occupational Safety and Health Administration, and other appropriate organizations. It is imperative that all emergency response agencies ensure that their members are adequately protected from the risks of transmission of infectious and communicable diseases--not only during emergency incidents, but throughout the work environment. This guide will be an important resource in the development of programs to provide this protection.

Sincerely,

Olin L. Greene
United States Fire Administrator

PREFACE

The United States Fire Administration (USFA) *Guide to Developing and Managing an Emergency Service infection Control Program* was prepared in conjunction with the National Fire Academy (NFA) field course, "Infection Control for Emergency Response Personnel: The Supervisor's Role." These two major Federal initiatives are designed to provide accurate information and guidance to the emergency services regarding communicable disease infection control.

The guide and course were developed by a team of experts in emergency service infection control. Both documents were reviewed for accuracy and comprehensiveness by representatives of pertinent agencies, including the U.S. Department of Health and Human Services/Centers for Disease Control (CDC) and the U.S. Department of Labor/Occupational Safety and Health Administration (OSHA).

The guide and course are designed to meet or exceed all applicable Federal/national laws, regulations, standards, and guidelines in effect at the time of publication. Many of these are included in their entirety in Appendix B of the guide. All course participants receive a copy of the guide as part of their course materials.

The principal development team for the guide included: David J. Barillo, M.D., Hazardous Materials Unit, Newark Fire Department, Newark, New Jersey: Anne O. Fabyan, Management Trainer/ Consultant, Fabyan & Associates, Melbourne Beach, Florida; Paul M. Maniscalco, Deputy Chief, New York City Emergency Medical Services, New York, New York; Edward McDonald, Battalion Chief, New York City Fire Department, New York, New York; Jon Pearson, Consultant, Summit Associates, Blue Ridge Summit, Pennsylvania; Dennis L. Rubin, Battalion Chief, Chesterfield Fire Department, Chesterfield, Virginia; Gordon M. Sachs, EMS Program Manager, U.S. Fire Administration, Emmitsburg, Maryland: and Katherine West, BSN, M.S. Ed., CIC, Infection Control/Emerging Concepts, Springfield, Virginia.

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INTRODUCTION

INTRODUCTION

This introduction to the USFA *Guide* identifies some of the problems of infection control and related issues in emergency response organizations. It previews general terminology and concepts that are discussed in more detail in later chapters. In addition, the scope and purpose of the Guide are examined, and its use by different audiences is described.

INFECTION CONTROL ISSUES

A call comes in from a physician's office requesting transport for a child with a high *fever and a rash. A BLS unit responds and transports a young boy* to *the hospital. Later, the crew hears via the 'grapevine" that the child has meningitis. The entire crew goes to the hospital and requests medication for the "exposure."*

A firefighter rescues an injured person from the rubble following an earthquake. He gets blood on his hands because of a tear in his latex gloves. At the hospital, initial blood work identifies the patient as having hepatitis C. The firefighter is not notified. Within five months, the firefighter develops hepatitis C and is denied workers' compensation since he cannot prove work-related exposure.

A call goes out for a suicide attempt via gunshot. Upon arrival, the crew finds medication vials which suggest that the patient may be infected with Human lmmunodeficiency Virus *(HIV). The crew refuses* to *transport the patient and the patient dies.*

Four patients in a hospital are found to have an upper respiratory infection caused by an unusual organism. An investigation reveals that the common factor in all four cases is that all the patients received ventilation assistance en route to the hospital in the same medic unit. The ventilation bag in the unit is cultured and the organism is recovered. One patient files suit against the ambulance crew and the department.

These actual scenarios underscore the critical need for emergency responders to practice and understand infection control. But, unfortunately, many fire, EMS, and police agencies are unprepared to address the technical and legal issues related to communicable disease transmission on the job.

They lack adequate policies and procedures, protective equipment, and/or training. Members may not even realize that a potential problem exists.

This lack of knowledge and established guidelines affects the operations of the agency and the well-being of its members. The problem can result in or contribute to:

- Unnecessary health risks for members and patients.
- Unwarranted fear and mental stress.
- Discrimination against members or patients.
- Personal and organizational liability.
- Avoidable costs.
- Employee attrition.

Is your organization prepared to deal with situations involving exposure to potentially infectious materials? Would you know what to do? How can these issues affect you! both personally and professionally? This Guide will help you find the answers to these and many other questions related to infection control in emergency response agencies.

WHAT IS INFECTION CONTROL?

Infection control includes any efforts designed to prevent infection from occurring in both patients and care providers. This definition intentionally goes beyond exposure control measures like putting on gloves or washing your hands. Infection control is a **comprehensive, proactive** approach to managing the risks associated with all infectious and communicable diseases. It includes member health programs, training, incident operations, post-exposure follow-up and care, documentation and reporting requirements, work station layout, and other related topics.

How serious is the threat of communicable disease transmission in the work environment? Unfortunately, only limited data is available, and much that exists is based on studies of non-emergency health-care providers. But consider the following:

- The Centers for Disease Control (CDC) reports that emergency medical workers are known to have an increased risk for hepatitis

B (HBV) infection. The degree of risk correlates with the frequency and extent of blood exposure during work activities. An increased risk must be assumed for all emergency service workers.

- The incidence of reported cases of HBV has been increasing in the United States, from 6.9/100,000 people in 1976 to 11.5/100,000 people in 1965.

- CDC estimates that 12,000 health-care workers, specifically including emergency medical workers, become infected with HBV each year. Five hundred to six hundred will be hospitalized as a result; approximately 250 will die. Other studies indicate that ten to thirty percent of health-care or dental workers show evidence of past or present HBV infection.

- Employees who can reasonably anticipate exposure to blood or other body fluids in the performance of their duties are also considered to be at substantial risk of occupational exposure to Human Immunodeficiency Virus (HIV), the organism that causes AIDS. (However, the risk of HIV infection following exposure is significantly less than the risk of contracting HBV after exposure.)

- The United States is confronting an AIDS epidemic. As many as one million persons are estimated to be infected with HIV, and the numbers are increasing. A study done at the Bronx Lebanon Hospital documented that the number of HIV-positive emergency room patients jumped from '13% to 23% between 1987 and 1988 alone.

- It has been further estimated that ninety percent of the people who are infected with HIV are unaware of their infective status.

These statistics only describe the risk of transmission for two communicable diseases--HIV and HBV. Many other diseases, each with its own characteristics and dangers, pose a health threat to emergency response personnel. These include tuberculosis, meningitis, rubella, measles, mumps, chickenpox, and syphilis.

The fact is that emergency responders routinely face the potential for exposure to debilitating and even life-threatening diseases. In the course of their duties, they come in contact with blood, body fluids, and other potentially infectious materials. Communal living and working conditions provide additional opportunities for the transmission of disease. And it's not just a concern for emergency medical services--it's a very real problem for **all** emergency responders, including fire, police, and other public safety workers.

THE NEED FOR A PROGRAMMATIC APPROACH

It is the responsibility of emergency response organizations to ensure that their members are adequately protected, not only during emergency incidents but throughout the work environment. Protection is achieved through adherence to work practices that minimize or eliminate exposure and through the use of personal protective equipment (i.e., gloves, masks, and protective clothing). In some situations, redesign of selected aspects of the job or work environment can further reduce risk.

Related techniques and equipment are readily available, commonly used, and minimally intrusive. But until recently, little guidance was available to help emergency services implement an effective approach to infection control. Recognizing this need, national organizations like CDC, the Occupational Safety and Health Administration (OSHA), and the National Fire Protection Association (NFPA) have identified specific guidelines and requirements for emergency response agencies. (A summary of relevant laws, regulations, and standards is included in Chapter 2 of this Guide; copies of many are included in Appendix B.)

To meet the recommendations set forth in these guidelines, each emergency response organization must implement an **infection control program.** A formal program is a written document (or a set of documents) that identifies the department's goals and objectives, policies, procedures, and other requirements related to infection control, such as an exposure control plan. It ensures that a holistic approach and clear guidelines are in place. The alternative is too often a reactive or "seat-of-the-pants" response to specific problems or situations that may end up being too little or too late to protect the member and the organization.

Developing an effective infection control program is easier said than done. Individuals and organizations typically resist change.

Sometimes, members feel that the risk is exaggerated or "just part of the job." In other situations, they are uncomfortable dealing with sensitive or controversial issues, such as sexual disease transmission. Unwarranted fears and irrational biases are sometimes factors.

Underlying these obstacles is a common problem: a lack of accurate information and supporting materials to help managers understand the problem and develop policies and procedures to deal with it. The result in many organizations is a lack of leadership or a low management priority given to infection control, often reflecting itself in an unrealistic concern about related costs. That is, until a member gets sick or a lawsuit is filed against the organization. But by then it may be too late.

THE USFA GUIDE

In response to the need for better supporting materials, the USFA prepared this Guide to *Developing and Managing an Emergency Service Infection Control Program.* The *Guide* is primarily designed to help managers develop, implement, manage, and evaluate infection control programs in their own organizations. Although it is not a requirement of any type, it will help emergency response organizations comply with applicable laws, regulations, and standards.

Purpose of the Guide

Specifically, the *Guide* is intended to help emergency service managers:

- Serve as a change agent within their organizations to promote development of an infection control program.
- Evaluate health, financial, and legal risks faced by personnel in the organization.
- Develop adequate policies, procedures, and formats for a comprehensive and effective program.
- Implement and administer the program to minimize health risks to emergency responders.
- Identify sources of additional information and assistance.

In addition, the *Guide* will help other personnel understand related concepts and clarify their roles and responsibilities in infection control. Background information and reference materials are included to assist in related research and training.

Using the Guide

Since infection control requirements vary by agency type, local regulations, department size, etc., emergency response organizations cannot simply adapt a generic program to their own needs. Each program is different. Therefore, this *Guide* is designed as a model **process,** not a model program. It will help tailor the requirements identified in regulations and standards to each organization's unique situation.

The structure of the *Guide* facilitates use for different purposes. Information builds progressively, following a typical organizational program development cycle: first, learning about infection control, then developing the program, and, finally, managing and maintaining it.

The first section, INFECTION CONTROL AND EMERGENCY RESPONSE provides an overview of infection control and the employer's responsibilities:

- Chapter 1, Technical Background introduces basic terms and concepts, and describes the risks associated with various communicable diseases.
- Chapter 2, Program Requirements summarizes applicable laws, regulations, and standards; describes general components of a comprehensive infection control program; and defines operational requirements of an effective program.

The second section of the *Guide,* BUILDING AN INFECTION CONTROL PROGRAM provides progressive detail on the major steps needed to establish and implement a comprehensive program:

- Chapter 3, Developing Organizational Support, describes common obstacles faced by managers in developing a program; provides a recommended strategy for overcoming those obstacles; and discusses tools available to the manager for promoting infection control.
- Chapter 4, Plan- Development. and implementation, describes 14 recommended

steps in detail, including examples as appropriate.

The final section MANAGING FOR RESULTS, provides guidance for administering, managing, and evaluating the infection control program:

- Chapter 5, Compliance and Quality Monitoring, explains the purposes, requirements, and tools available to determine if the program is being adequately implemented and enforced.
- Chapter 6, Program Evaluation, describes methods for analyzing the overall effectiveness of the program and for making revisions to ensure continued effectiveness.
- Chapter 7, Information Management, provides an overview of concepts and methods for infection control data gathering, recordkeeping, and reporting.

In addition. the *Guide* also contains a bibliography of useful reference documents and several appendices:

- A Glossary of Common Terms used in infection control.
- Complete text of major Laws, Standards, and Guidelines of interest to managers of infection control programs.
- Sources of Additional Information for special needs in infection control.

The USFA *Guide* meets or exceeds all requirements specified by applicable regulations and standards at the time of publication. However, users are encouraged to go beyond the information contained in the Guide to address specific needs. Instructions for tailoring the document to local requirements are included throughout.

Managers should also keep in mind that infection control is a rapidly evolving field. It is critical to keep up with medical and legal developments and to make sure that mechanisms exist to integrate new information into existing programs.

SECTION I

INFECTION CONTROL AND EMERGENCY RESPONSE

CHAPTER 1

TECHNICAL BACKGROUND

TECHNICAL BACKGROUND

This chapter provides an introduction to the basic principles of infection control in the emergency service environment. Technical terms are defined. The risk of occupational exposure to communicable disease is discussed.

INFECTION CONTROL HISTORY

Infection control was born in the mid-1600s in Vienna, Austria when a physician named Ignaz Semmelweis observed that hand washing reduced the incidence of infection in women following childbirth. Semmelweis traveled to other European cities to demonstrate that hand washing could reduce deaths related to infection. Even though he had reduced infection from eighteen percent to one percent in the Vienna hospital, at the time he was not taken seriously by the medical community.

Unfortunately, even now, in the 1990s the importance of hand washing is still not taken seriously. Although hand washing remains the most fundamental measure for controlling infection, it has been demonstrated that only forty percent of the health care providers in the U.S. practice good hand washing techniques. Infection rates in patients, hospital personnel, and emergency responders continue to be a national problem, despite continuing improvements in medical technology.

EMERGENCY SERVICE

Infection control procedures have been developed and refined continuously over the years. Unfortunately, research on the incidence of infection, the spread of infection from patient to care provider, and the incidence of infection related to contaminated medical equipment has been limited almost exclusively to hospital-based studies. To date, there are few studies related to the incidence of disease in the emergency response environment. As a result, recommended practices/procedures for emergency responders are generally modifications of those established for in-hospital personnel.

Without clear data, it is often difficult to demonstrate the need for infection control procedures in emergency services. However, the CDC has classified emergency response personnel as being at high risk group for exposure. They face the same potential for exposure as hospital personnel. Moreover, the volatility and unpredictability of the emergency scene increases the level of risk.

CDC's *Guidelines* state that when it is difficult or impossible to differentiate between body fluids, all body fluids should be treated as if they are potentially hazardous:

> "The unpredictable and emergent 'nature of exposures encountered by emergency and public-safety workers may make differentiation between hazardous body fluids and those which are not hazardous very difficult and often impossible. For example, poor lighting may limit the worker's ability to detect visible blood in vomitus or feces. Therefore, **when emergency medical and public-safety workers encounter body fluids under uncontrolled, emergency circumstances in which differentiation between fluid types is difficult, If not Impossible, they should treat all body fluids as potentially hazardous."**

BASIC CONCEPTS

In order to develop and implement an effective infection control program, a basic understanding of key infection control concepts is required.

DISEASE-PRODUCING ORGANISMS

Viruses and bacteria are the organisms commonly responsible for the spread of disease. Viruses normally reside in a living host and cannot multiply outside of a living cell. On the other hand, bacteria can multiply outside the body, i.e., on surfaces or objects. (Items such as bag-valve masks have been implicated in the spread of disease from one patient to another; thus, the proper cleaning of equipment is critical.)

INFECTIOUS VS. COMMUNICABLE DISEASE

An infectious disease results from invasion of a host by disease-producing organisms, such as bacteria, viruses, fungi, or parasites. A communicable (or contagious) disease is one that can be transmitted from one person to another.

Not all infectious diseases are communicable. For example, salmonella is a highly infectious disease; everyone has heard stories about large numbers of people getting "food poisoning" from poorly prepared food which contained salmonella bacteria. But, salmonella is not contagious. On the other hand, chickenpox is an infectious disease which is also communicable--it can be easily transmitted from one person to another. Thus, infection control for emergency service operations is primarily, but not solely, concerned with communicable disease.

MODES OF TRANSMISSION

A communicable disease can be spread directly or indirectly. Direct transmission occurs through direct contact with the blood or other body substances of an infected individual. Indirect transmission occurs without person-to-person contact; the disease-producing organism passes from the infected individual to an inanimate object. Another person comes in contact with the contaminated object and contracts the disease.

A communicable disease may be bloodborne or airborne. Bloodborne diseases are spread by direct contact with the blood or other body substances of an infected person. Bloodborne diseases of most concern to emergency responders include Human Immunodeficiency Virus (HIV), hepatitis B, and hepatitis C.

Airborne diseases are spread by droplets of the disease-producing organism being expelled into the air by a productive cough or sneeze or by direct contact with infected bodily secretions. Airborne diseases include tuberculosis, meningitis, mumps, rubella, and chickenpox.

ASSESSING RISK POTENTIAL

Any exposure to a communicable disease carries a certain amount of risk. An exposure occurs whenever there is contact with blood or other body fluids through open wounds, mucous membranes, or parenteral (by injection) routes. The degree of risk depends on the degree of exposure.

Four factors are critical in assessing potential risk in any exposure situation:

- Communicability

  Identification of the causative agent is critical. As noted previously, some disease-producing organisms are more readily communicable than others. Also, some are capable of causing more serious effects (e.g., the "common cold" is highly infectious, but its effects can be tolerated by most individuals).

- Dosage of the Disease-Producing Organism

  Dosage refers to the number of viable (live) organisms received during an exposure. Each illness requires that a certain number of infectious agents be present in order to cause disease. For example, one hepatitis B virus in one milliliter of blood may be ail that is needed to spread the infection, while 100,000 HIV viral particles may be needed.

- Virulence of the Disease-Producing Organism

  Virulence is the disease-evoking power of the organism--the strength or ability of the organism to infect or overcome bodily defenses. This varies from one situation to another. In most cases, the organism must be one that survives outside the body. For example, the organisms that cause TB and HIV die when exposed to light and air, while the hepatitis B virus has been shown to live on a surface for days to weeks and still be infectious.

- Host Resistance

  Host resistance is the ability of the host to fight infection. infection occurs as a result of

an interruption in the body's normal defense mechanism, which allows the organism to enter the body. Typically, the healthier you are, the less likely you will become ill.

EXPOSURE TO AIRBORNE DISEASES

Two additional factors can affect the potential for infection from airborne diseases: duration of exposure and ventilation. Some diseases require prolonged exposure in order to contract the disease. Therefore, shorter transport times can reduce risk potential.

And, as noted previously, many organisms die when exposed to light and air; thus risk potential can also be reduced by maximum ventilation. The rapid fresh air exchange system built into newer rescue vehicles assures adequate ventilation. But, on older vehicles, personnel should open windows whenever possible.

EXPOSURE TO BLOODBORNE DISEASES

Risk of infection from bloodborne diseases varies according to the type of exposure. The list below was published by the CDC to help evaluate risk levels. (Risk level increases from top to bottom.)

- Blood/Body fluid contact to intact skin.
- Blood/Body fluid contact to the mucous membrane surface of the eyes, nose, or mouth.
- Blood/Body fluid contact with an open area of the skin.
- Cuts with sharp objects covered with blood/body fluid.
- Contaminated needle stick injury.

INFECTION CONTROL TECHNIQUES

Universal precautions is an infection control strategy developed for hospital workers by the CDC. Specific precautionary procedures are recommended for reducing potential exposure to bloodborne pathogens. **Universal precautions** are based on the concept that blood and certain body fluids of all patients should be considered potentially infectious for HIV, HBV, and other bloodborne pathogens.

Specific body fluids (in addition to blood) to which universal precautions apply include: any body fluids containing visible blood; semen; vaginal secretions; tissues; cerebrospinal fluid (CSF), synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluids.

Body substance Isolation (BSI) goes a step beyond universal precautions and considers all body substances potentially infectious. Thus, the following body fluids/substances would **also** be considered potentially infectious; feces, nasal secretions, sputum, sweat, tears, urine, and vomitus. Such an approach is obviously wiser in the emergency response environment where medical histories are not usually known. In effect, each emergency incident has exposure potential.

BSI is generally accomplished through the barrier technique--the use of personal protective equipment (gloves, masks, protective eyewear, gowns, and resuscitation devices) to prevent personal contact with blood or other potentially infectious materials.

Other infection control techniques include proactive preventive measures such as:

- Proper personal hygiene.
- Immunization programs.
- Decontamination procedures.
- Proper waste handling and waste disposal practices.

The chart on the following pages summarizes information on specific diseases/infections which are of greatest concern to emergency response personnel. For each disease/infection the chart identifies mode of transmission whether a vaccine is available, and sign/symptoms.

SUMMARY

The intent of this chapter was to provide a brief overview of communicable disease and infection control principles, as background information for the rest of the *Guide.* It must be emphasized that the first step in developing an effective infection control program is learning as much as possible about various types of communicable disease. Later chapters will emphasize the

importance of capitalizing on ail available expertise, e.g., enlisting the help of local health practitioners and/or infection control experts. Additional sources of up-to-date information are provided in the Bibliography and in Appendix D.

DISEASE INFORMATION FOR EMERGENCY RESPONSE PERSONNEL

Disease/Infection	Mode of Transmission	is Vaccine Available?	Signs and Symptoms
AIDS/HIV (human mmunodeficiency virus)	Needlestick, blood splash into mucous membranes (e.g., eyes, mouth), or blood contact with open wound.	NO	Fever, night sweats, weight loss, cough.
Chickenpox	Respiratory secretions and contact with moist vesicles.	NO	Fever, rash cutaneous vesicles (blisters).
Diarrhea: Campylobactor Cryptosporidium Giardia Salmonella Shigella Viral Yersinia	Fecal/Oral.	NO	Loose, watery stools.

DISEASE INFORMATION FOR EMERGENCY RESPONSE PERSONNEL (cont'd)

Disease/Infection	Mode of Transmission	Is Vaccine Available?	Signs and Symptoms
German Measles (Rubella)	Respiratory droplets and contact with respiratory secretions.	YES	Fever, rash.
Hepatitis A (Infectious Hepatitis)	Fecal/Oral.	NO	Fever, loss of appetite; jaundice, fatigue.
Hepatitis B (HBV) (Serum Hepatitis)	Needlestick, blood splash into mucous membranes (e.g., eye or mouth), blood contact with open wound. Possible exposure during mouth-to-mouth resuscitation.	YES	Fever, fatigue, loss of appetite, nausea, headache, jaundice
Hepatitis C	Same as hepatitis B	NO	Same as hepatitis B
Hepatitis D	Same as hepatitis B dependent on HBV (past or present) to cause infection.	NO	A complication of HBV infection and can increase the severity of HBV infection.
Other non-A, non-B Hepatitis	Several viruses with different modes of transmission. (These are called "non-A, non-B" because there are no specific tests to identify them.)	NO	Fever, headache, fatigue, jaundice.

DISEASE INFORMATION FOR EMERGENCY RESPONSE PERSONNEL (cont'd)

Disease/Infection	Mode of Transmission	Is Vaccine Available?	Signs and Symptoms
Herpes Simplex (Cold Sores)	Contact of mucous membrane with moist lesions. Fingers are at particular risk for becoming infected.	NO	Skin lesions located around the mouth area.
Herpes Zoster (Shingles) localized disseminated (See Chickenpox)	Contact with moist lesions.	NO	Skin lesions.
Influenza	Airborne.	YES	Fever, fatigue, loss of appetite, nausea, headache.
Lice: Head, Body, Pubic	Close head to head contact. Both body and pubic lice require intimate contact (usually sexual) or sharing of intimate clothing.	NO	Severe itching and scratching, often with secondary infection. Scalp and hairy portions of body may be affected. Eggs of head lice (nits) attach to hairs as small, round, gray lumps.

DISEASE INFORMATION FOR EMERGENCY RESPONSE PERSONNEL (cont'd)

Disease/Infection	Mode of Transmission	Is Vaccine Available?	Signs and Symptoms
Measles	Respiratory droplets and contact with nasal or throat secretions. Highly communicable.	YES	Fever, rash, bronchitis.
Meningitis: Meningococcal	Contact with respiratory secretions.	NO	Fever, severe headache, stiff neck, sore throat.
Haemophiius influenza (usually seen in very young children)	Contact with respiratory secretions.	NO	(Same)
Viral Meningitis	Fecal/Oral.	NO	(Same)
Mononucleosis	Contact with respiratory secretions or saliva, such as with mouth-to-mouth resuscitation.	NO	Fever, sore throat, fatigue.
Mumps (infectious parotitis)	Respiratory droplets and contact with saliva.	YES	Fever, swelling of salivary glands (parotid).

DISEASE INFORMATION FOR EMERGENCY RESPONSE PERSONNEL (cont'd)

Disease/Infection	Mode of Transmission	Is vaccine available?	Signs and Symptoms
Salmonellosis	Foodborne	NO	Sudden onset of fever, abdominal pain, diarrhea, nausea, and frequent vomiting.
Scabies	Close body contact.	NO	Itching, tiny linear burrows or 'tracks," vesticles - particularly around finger, wrists, elbows, and skin folds.
Syphilis	Primarily sexual contact; rarely through blood transfusion.	NO	Genital and cutaneous lesions, nerve degeneration (late).
Tuberculosis, pulmonary	Airborne	NO	Fever, night sweats, weight loss, cough.
Whooping cough (pertussis)	Airborne, direct contact with oral secretions.	YES	Violent cough at night, whooping sound when cough subsides.

CHAPTER 2

PROGRAM REQUIREMENTS

PROGRAM REQUIREMENTS

A formal infection control program should have two basic goals: (1) to provide all members with the best possible protection from communicable disease; and (2) to protect the department or jurisdiction from potential liability. A resultant third goal is the protection of patients from potential infection. A properly designed infection control program will help manage civil liability, lower health insurance costs, minimize "sick time" and ensure compliance with all applicable statutes.

To design such a program, knowledge of applicable laws, standards, and guidelines is a prerequisite. In addition, the entire spectrum of emergency response must be considered, since infection can occur before, during, or after emergency response operations. For this reason, the plan must cover pre-response, incident operations, post-response, and station issues.

This chapter summarizes current national laws, standards, and guidelines which relate to emergency service infection control. Recommended program components are introduced and operational requirements are reviewed.

LAWS, STANDARDS, AND GUIDELINES

Many Federal/national organizations play a critical role in establishing requirements and recommendations for infection control in the work environment. The following sections summarize current guidelines set forth by:

- Public Law (U.S. Congress).
- The Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.
- The National Fire Protection Association (NFPA).
- The U.S. Department of Health and Human Services, Centers for Disease Control (CDC).

Ensuring compliance with all of the standards described in this *Guide* is an important first step in developing an effective infection control program. However, additional research will be needed to identify state and/or local regulations which also apply.

While state/local regulations will vary from jurisdiction to jurisdiction, some of the more common ones include:

- **Duty-to-act laws** which require emergency response personnel to provide a "reasonable level of care" to all patients.
- **Patient abandonment laws** which specify that patient care may only be relinquished to someone having an equal or higher level of medical expertise.
- **Biohazard waste laws** which govern the storage, handling, and disposal of medical waste.

PUBLIC LAW

THE RYAN WHITE COMPREHENSIVE AIDS RESOURCES EMERGENCY ACT OF 1990 (PL 101-381)

This act delineates specific notification requirements which allow emergency response personnel to find out if they have been exposed to an "infectious disease" while providing patient care. Diseases covered include hepatitis B, tuberculosis, meningococcal (bacterial) meningitis, and HIV.

Each employer of emergency response personnel is required to name a "designated officer" to coordinate communication between the treating facility (hospital) and the emergency response organization. Notification of exposure may be "routine" or "by request."

- **Routine notification** must be provided by the treating facility to the designated officer when it is determined that a patient transported by emergency response personnel has an airborne communicable disease. This includes patients that expire in transit, or shortly afterwards. Notification must be made no later than 48 hours after the diagnosis is made. Routine notification only pertains to transportation crews, and

does not cover responders who provide on-scene care but not transportation.

- **Notification by request** can be made by any member who "attended, treated, assisted, or transported" a victim of an emergency, where exposure to infectious disease may have occurred. This request is made through the designated officer, who reviews the case and notifies the treating facility. The treating facility reviews the case and notifies the designated officer that: a) an exposure took place; b) an exposure did not take place; or c) insufficient information exists to determine exposure risk. In disputed cases, or cases of insufficient information, the designated officer may utilize the services of the local public health officer in resolution of the case.

This Act does not authorize mandatory patient testing for infectious diseases. (See Appendix B for the sections of PL 101-381, Subtitle B, which apply to emergency response personnel.)

AMERICANS WITH DISABILITIES ACT PL 101-336

This act provides a national mandate for the elimination of discrimination against individuals with disabilities. The ADA prohibits discrimination against disabled individuals in the areas of hiring, firing, promotion, benefits, and management of staff. The ADA obligates employers to make **reasonable accommodation** to the disabilities of otherwise qualified people, in order to guarantee equal employment opportunities.

"Contagious diseases," such as tuberculosis and HIV infection, are considered disabilities under the ADA. People with contagious (communicable) diseases are protected against discrimination, as long as they can perform the essential functions of a job and do not pose a threat to the health and safety of others in the workplace. Cases must be considered individually; one individual who has a communicable disease and poses a serious health threat does not justify excluding all persons with actual or perceived communicable diseases.

Fear expressed by other employees of being infected by an employee with a communicable disease does weaken the employee's status as being "othewise qualified." Such fear must be supported by objective evidence of risk. If, for example, a person poses a significant risk of transmission of infection that cannot be eliminated by reasonable accommodation, the person may be found to constitute a direct threat to the health or safety of others.

The ADA becomes effective in July 1992 for any organization that employs 25 or more people, and in July 1994 for organizations that employ 15-24 people. This includes most emergency response organizations in the United States.

There are several important reasons why emergency response organizations need to understand and comply with the ADA. Clearly, the ADA poses a substantial potential liability to any employer who fails to heed the requirements of the Act. Lawsuits and/or fines may be a result of discriminatory acts in hiring, firing, promotion, benefits, and/or management of staff.

- Compliance may be costly, and must be considered in budgetary planning;
- Preparation time for compliance is limited;
- Training of employees, supervisors, and managers may be necessary; and
- Labor issues must be considered when appropriate.

OSHA REGULATIONS

The Occupational Safety & Health Administration (OSHA), U.S. Department of Labor, is the branch of the federal government responsible for safety in the workplace.

OSHA publishes federal regulations which establish minimum standards for workplace safety and health. Each state, territory, or possession has the option of adopting OSHA regulations as published, or enacting "state" OSHA plans which are at least as stringent as the federal standards.

STATES/TERRITORIES WITH OSHA PLANS

Alaska
Arizona
California
Connecticut
Hawaii
Indiana
Iowa
Kentucky
Maryland
Michigan
Minnesota
Nevada
New Mexico
New York
North Carolina
Oregon
Puerto Rico
South Carolina
Tennessee
Utah
Vermont
Virginia
Virgin Islands
Washington
Wyoming

APPLICABILITY

Emergency service personnel are not always covered by OSHA regulations. Determining whether or not any particular agency is required to comply with OSHA regulations requires research. However, the following general guidelines apply.

- Federal OSHA ragulations generally apply only to private empoyers. Thus, in states which have simply adopted the federal OSHA regulations most emergency service personnel (whether paid or volunteer) are not covered.

- If a state opts to develop its own OSHA plan, all paid state and local government employees (including emergency response personnel) must be covered. (In some states, only state and local employees are covered.) However, each specific state decides whether or not to include volunteer emergency response personnel. At present, 23 states, the Virgin Islands, and Puerto Rico have "state" OSHA plans. (See chart above.)

- One exception to the preceding guidelines is that emergency response personnel involved in hazardous materials response are covered under the Superfund Amendments and Reauthorization Act (SARA) of 1986. This Act mandates enforcement of OSHA 29 CFR Part 1910.20. In addition, Section 126 requires the Environmental Protection Agency to issue an identical set of regulations to cover state and local government employees not presently covered under a "state" OSHA program.

It must be stressed that the communicable disease risks and hazards are the same in each state, regardless of local compliance requirements. Thus, adherence to OSHA regulations is recommended for all emergency service agencies. Legislation is pending which would expand OSHA requirements to cover all employees, public and private, in all states.

RELEVANT REGULATIONS

OSHA regulations related to infection control include:

- 29 CFR Part 1910.1030 *Occupational Exposure to Bloodborne Pathogens.*

- *29* CFR Part 1910.20 *Access to Employee Exposure* and Medical *Records.*

These regulations are described below; complete texts are included in Appendix D.

OCCUPATIONAL EXPOSURE TO BLOODBORNE PATHOGENS (29 CFR PART 1910.1030)

This regulation, effective March 6, 1992, establishes standards for workplace protection from bloodborne diseases. The primary diseases of concern are hepatitis B (HBV) and Human Immunodeficiency Virus (HIV). The primary methods of protection are training, engineering and work practice controls, immunization against HBV, and the use of universal precautions.

The provisions of this regulation were developed with the emergency services in mind. Recognizing that the tasks performed by emergency responders are often undertaken

during uncontrolled emergency situations, the regulation states that **all body fluids are considered Infectious when differentiation between fluid types is difficult.**

Each employer must establish an "exposure control plan." The plan must: (1) identify and categorize all job classifications and tasks which can reasonably be anticipated to have a potential for exposure to blood or body fluids; (2) delineate the implementation plan and schedule for the infection control program; and (3) identify the procedures for evaluating/investigating exposure incidents.

This regulation prohibits eating, drinking, smoking, applying cosmetics, or handling contact lenses in work areas where there is potential for occupational exposure to bloodborne pathogens. Hands must be washed as soon as feasible after removal of gloves or other personal protective equipment; if handwashing facilities are not available (e.g, at the emergency scene), alternative handwashing provisions must be provided by the employer.

Personal protective equipment (PPE) is covered in detail. Employers are required to supply, repair, and replace PPE including gloves, gowns, face shields or masks and eye protection, and resuscitation equipment.

Exemptions to the use of PPE are allowed where "its use would have prevented the delivery of health-care of public safety services or would have posed an increased hazard to the safety of the worker or co-workers." These exemptions are meant to apply to unexpected, "rare and extraordinary circumstances." the decision not to use PPE rests with the employee, and not the employer.

Guidelines for post-exposure care are presented, including the need for medical recordkeeping. Each employee must receive a copy of the regulation, and, to assure understanding, must receive training in communicable disease/infection control. Written training records must be maintained, including attendance. Training must be provided annually in each of the following subjects:

- Epidemiology, modes of transmission, and symptoms of bloodborne diseases.
- The employer's exposure control plan.
- Recognition of tasks that may result in exposure to bloodborne diseases.
- Use and limitations of practices that will reduce or prevent exposures.
- Proper selection, use, location, removal, handling, decontamination, and disposal of PPE.
- Information on hepatitis B vaccine.
- Emergency procedures, including post-exposure requirements.
- Recognition of standard biohazard markings, color-coding, and labeling.

The regulation also requires that an opportunity for interactive questions and answers be provided at each training session.

ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS (29 CFR PART 1910.20)

This section provides for employee access to their own medical and exposure records and regulates the storage of such records. Employers must make medical and relevant exposure records available within fifteen days of any formal request. A physician representing the employer may recommend that the records be released as a summary rather than the complete chart, or that the records be released only to a physician. This section also allows OSHA access to medical and exposure records.

Employee medical/exposure records must be maintained for the duration of employment plus thirty years. Instruction on transfer of records is provided for businesses that close before the thirty year limit is reached.

NFPA

Standards and codes published by the National Fire Protection Association (NFPA) represent the consensus opinions of a committee of experts representing different interests relating to the subject matter involved. NFPA standards do not have the force of law, unless written into local law by reference or adoption, nor does NFPA enforce or monitor compliance. However, since NFPA standards reflect the national

"industry standard," a department not meeting these standards could face possible liability in the event of litigation.

NFPA 1500 (1987 EDITION)

NFPA 1500, *Fire Department Occupational Safety and Health Program,* is an umbrella document, intended to establish a framework for a comprehensive safety and health program. This standard requires an official written department occupational safety and health policy, and the appointment of a department safety officer, an occupational safety and health committee, and a fire department physician.

Health maintenance issues addressed include pre-entry health examinations and health reassessment annually and after "debilitating illnesses or injuries." Specific recommendations for components of the annual examination are contained in Appendix A-8-l .2.

Infection control recommendations include active attempts to identify and limit member exposure to contagious diseases, and "inoculations vaccinations, and other treatment." A health database must be established to document occupational illnesses, injuries, and exposures (chemical or infectious). The confidentiality of medical records is emphasized.

Preventive health measures recommended include a hearing conservation program, a physical fitness program, and a member assistance program including post-traumatic incident debriefing. Recordkeeping requirements and confidentiality safeguards for member assistance programs are listed.

A revised NFPA 1500 is expected to be adopted in 1992. A new standard NFPA 1582, *Standard on Medical Requirements for Fire Fighters* is also expected to be adopted. NFPA 1582 will contain specific revised medical requirements replacing those currently found in NFPA 1500 and NFPA 1001.

NFPA 1501 (1987 EDITION)

NFPA 1501, *Standard for Fire Department Safety Officer,* establishes the need and standards for a department safety officer. The fire chief, however, still has the ultimate responsibility for the department occupational safety and health program.

The safety officer must "have and maintain a knowledge of the current health and physical fitness factors" that affect the work environment. The safety officer has the authority to "alter, suspend, or terminate" activities "judged to be unsafe and to jnvolve an imminent hazard" on the fireground.

This standard requires the establishment of a department database to maintain records of all "accidents, occupational deaths, injuries, illnesses, and exposures." The safety officer is responsible for the management and analysis of this information.

NFPA 1501 is presently being revised and will be renumbered NFPA 1521 when the 1992 edition is published.

NFPA 1581 (1991 EDITION)

NFPA 1581, *Standard on Fire Department infection Control Program* establishes minimum requirements for infection control in emergency service organizations. Specific areas addressed include:

- Program components.
- Designation of an Infection Control Liaison.
- Station facilities requirements.
- PPE.
- Cleaning, disinfection, and disposal procedures.
- Immunization requirements.
- Post-exposure procedures.

Some of the requirements actually go beyond current OSHA and CDC recommendations. For example, OSHA and CDC presently recommend immunization only for hepatitis B; NFPA recommends immunization for hepatitis B, tetanus, diphtheria, rubella, measles, polio, and influenza.

NFPA 1001 (1987 EDITION)

NFPA 1001, *Standard for Firefighter Professional Qualifications,* identifies the professional levels of competence required of fire department members. This document describes

medical requirements for fire department candidates.

A very detailed list of medical conditions to be looked for in entrance examinations is presented. This can serve as a starting point for departments that are interested in designing their own entrance medical evaluations.

As stated previously, the medical requirements in NFPA 1001 are presently being revised and a separate standard will address entrance and ongoing medical requirements. NFPA 1582, *Standard on Medical Requirements For Fire Fighters (Proposed),* is scheduled to be completed and adopted by NFPA in May, 1992. NFPA 1582 will supersede the medical requirements outlined in NFPA 1001.

CDC

The Centers for Disease Control (CDC) publishes the *Morbidity and Mortality Weekly Report* (MMWR), a weekly update of information on communicable diseases. The most recent issues dealing with worker protection from HIV and HBV are summarized below. The department infection control officer should periodically review MMWR for new information. A subscription is expensive; however, the contents are summarized weekly in the *Journal of the American Medical Association,* which is often available in libraries. Liaison with a local infection control practitioner is another possible source.

GUIDELINES FOR PREVENTION OF TRANSMISSION OF HUMAN IMMUNODEFICIENCY VIRUS AND HEPATITIS B VIRUS TO HEALTH CARE AND PUBLIC SAFETY WORKERS. (MMWR VOL. 38, NO. 2-6, 1989.)

This document was published in response to the Health Omnibus Programs Extension Act of 1988 (PL 100-807) which mandated that it be prepared in ninety days. For this reason, essentially no new scientific information was presented. However, universal precautions were expanded to the extent that "under uncontrolled, emergency circumstances in which differentiation between fluid types is difficult..." all body fluids should be considered potentially hazardous. This document was also published as a freestanding publication in February 1989.

This document is often considered the "Bible" on emergency service infection control; however, most of the information contained herein was taken from other MMWEs. Two of these are included in the Appendix of the *Guidelines* and are discussed below. (See Appendix B of this guide for the complete text.)

UPDATE: UNIVERSAL PRECAUTIONS FOR PREVENTION OF TRANSMISSION OF HUMAN IMMUNODEFICIENCY VIRUS, HEPATITIS B VIRUS, AND OTHER BLOODBORNE PATHOGENS IN HEALTH CARE SETTINGS. (MMWR VOL. 37, NO. 24, JUNE 24, 1988.)

In this document, universal precautions were extended to include: body tissues and cerebrospinal, synovial, pleural, pericardial, and amniotic fluids.

Universal precautions were still not required for feces, nasal secretions, sputum, urine, tears, or vomitus, unless they contain visible blood. It was acknowledged that these fluids can contain HBV or HIV virus, but transmission had not yet been documented.

Similarly, universal precautions were not required for saliva. Although HIV/HBV transmission was unlikely, it could not be entirely ruled out.

Blood was cited as the most important source of HIV/HBV infection in occupational settings. It was noted that semen and vaginal secretions can transmit HIV/HBV as sexual diseases.

RECOMMENDATIONS FOR PREVENTION OF HIV TRANSMISSION IN HEALTH-CARE SETTINGS (MMWR VOL. 36, NO. 2, AUGUST 21, 1987)

This document established the concept of "universal precautions." Under universal precautions, the blood and certain body fluids of all patients are considered potentially infectious. For this reason, precautions need to be taken with all patients. (The previous standard, "Blood and Body Fluid Precautions" [MMWR, 19831 called for protective measures only when patient infection was known or suspected.)

Although saliva had not been implicated in HIV transmission to date, the use of mouthpieces or resuscitation bags to minimize the need for

mouth to mouth resuscitation was recommended.

Standard sterilization and disinfection procedures currently in use were determined adequate for HIV. Concentrations of household bleach diluted 1 :lO to 1 :lOO were considered effective, depending on the amount of organic material (blood, mucus) present.

Environmental surfaces (walls, floors) normally had not been previously associated with transmission of infection. Thus, extraordinary attempts to disinfect or sterilize these surfaces were determined to be unnecessary.

The more recent MMWRs on tuberculosis and hepatitis are described below, but are not included in the Appendix of this *Guide.*

GUIDELINES FOR PREVENTING THE TRANSMISSION OF TUBERCULOSIS IN HEALTH-CARE SETTINGS, WITH SPECIAL FOCUS ON HIV-RELATED ISSUES (MMWR VOL. 39, NO. RR-17, DECEMBER 7, 1990)

This document reviewed the mode and risk of tuberculosis transmission in health-care settings and made recommendations for reducing the risk of transmission to workers, patients, volunteers, and visitors.

The guidelines presented in this document include provisions for the use of surgical masks or disposable, valueless particulate respirators (PR). PRs are recommended because they have a better facial fit and better filtration capability than surgical masks. Two recommendations specific to emergency medical services are:

- "When emergency-medical-response personnel or others must transport patients with confirmed or suspected active tuberculosis, a mask or valveless PR should be fitted on the patient. If this is not possible, the worker should wear a PR (see sections ll.C.2 and ll.D.2.C.). If feasible, the rear windows of the vehicle should be kept open and the heating and air conditioning system set on a nonrecirculating cycle.

- Emergency response personnel should be routinely screened for tuberculosis at regular intervals. They should also be included in the follow-up of contacts of a patient with infectious tuberculosis (see section lll.A.7.)"

PROTECTION AGAINST VIRAL HEPATITIS; RECOMMENDATIONS OF THE IMMUNIZATION PRACTICES ADVISORY COMMITTEE (ACIP). (MMWR VOL. 39, NO. RR-2, FEBRUARY 9, 1990)

This document updated available information on the hepatitis viruses. Of particular interest is the section on post-exposure prophylaxis. This information is essential in establishing the proper timeframes for medical follow-up and ensuring that proper follow-up treatment is administered.

Of key importance is the update on hepatitis B vaccine administration. Pre-vaccine testing is no longer required, but post-vaccine testing is recommended. New guidelines suggest re-evaluation to determine booster needs after seven years, NOT five years as originally published.

The section on NANB hepatitis is also important since the occurrence of this disease is increasing in this country, especially among populations of intravenous drug users.

INFECTION CONTROL PROGRAM COMPONENTS

A comprehensive infection control program which takes into account all of the laws, standards, and guidelines discussed previously will include the components described below. Each of these components will be discussed in detail in later chapters.

- Written Policy Statement

  The department should have a written policy statement that clearly explains the intent, benefits, and purpose of the infection control program. This statement should define the department's philosophy on

infection control, including such issues as work restrictions and members infected with HIV and/or other communicable diseases.

- **Exposure Control Plan**

  OSHA regulations require employers, including applicable emergency services, to establish an exposure control plan. (See previous discussion under "Occupational Exposure to Bloodborne Pathogens" (29 CFR, Part 1910.1030).

- **Standard Operating Procedures (SOPS)**

  While the policy statement is intended to provide general guidance, the SOPs should provide specific regulation of daily activities. Normally, the SOPs would include delegation of specific roles and responsibilities related to infection control, as well as procedural guidelines for all required tasks and functions. (See "Operational Requirements of Infection Control Program Checklist" on next page. Chapter 4 provides detailed recommendations for each item.)

- **Information Management**

  An effective infection control program generates a substantial amount of data, e.g., member health records, training records, etc. An efficient information management system which assures appropriate confidentiality of medical information is an essential program requirement.

- **Training and Education**

  Members must be trained in the proper use of PPE, exposure protection, post-exposure protocols, and other infection control subjects. Members also must receive education on diseases, modes of transmission, and related topics.

- **Compliance and Quality Monitoring**

  The program must include formal processes for monitoring member compliance with established SOPs. Noncompliance must be documented and corrected.

- **Program Evaluation**

  Program evaluation allows analysis of program effectiveness, feedback for program improvement, and updating to reflect new medical or regulatory information. Periodic review and updating of the infection control plan is required by OSHA.

The "Program Components/Operational Requirements" Matrix on page 32 provides an analysis of specific infection control program components required/recommended by current laws, standards, and guidelines.

OPERATIONAL REQUIREMENTS OF INFECTION CONTROL PROGRAM CHECKLIST

Health Maintenance

- Pre-entry health assessment
- Immunization
- Ongoing health assessment
- Member Assistance Programs
- Medical Records

Incident Operations and Recovery

- Preparation for response
  - Infection control training
  - Storage and maintenance of PPE on response vehicles
- Scene management
  - Operations at the scene
  - Public relations
  - Public information
- Post-response
  - Cleaning, disinfection, sterilization
  - Maintenance and storage of PPE
  - Proper disposal techniques

Post-Exposure

- Notification
- Verification
- Treatment and follow-up care
- Documentation and recordkeeping

Station Issues

- Kitchen facilities
- Sleeping quarters
- Sleeping quarters
- Bathrooms
- Laundry
- Equipment storage, disinfecting, and disposal areas

OPERATIONAL REQUIREMENTS

OVERVIEW

The areas covered by a typical comprehensive infection control program are presented here. Many of these elements may already be in place in your department. For example, many departments provide yearly medical exams for members who use SCBA, or for members of hazardous materials teams. These services need not be duplicated; rather they can be modified to meet infection control standards.

Health Maintenance

The health of emergency response personnel is a responsibility shared by the member, the supervisor/chain of command, and the department. A health maintenance system is designed to optimize the health of members and to minimize the chance of occupational injury or infection. While we can minimize these health risks, no system can eliminate them completely. Typical elements of a health maintenance system include: pre-entry assessment, ongoing assessment, post-exposure, and member assistance programs. Post-exposure programs will be discussed in a subsequent module.

Health maintenance starts with a pre-entry or pre-employment health assessment. No one should be assigned to emergency response duties before this evaluation is completed. At the same time, immunization against communicable diseases should be offered. Immunizations commonly given to emergency response personnel include hepatitis B, measles/mumps/rubella (MMR), polio, tetanus/diphtheria (DT), and influenza. OSHA requires that emergency response personnel be offered hepatitis B immunization free of charge. It is the member's right to refuse these immunizations; any refusal should be documented carefully.

From a cost analysis standpoint, immunization makes sense. Acute hepatitis infection may keep a member out of work for several weeks or even months. Chronic hepatitis B can be a lifelong disability. The member may not be able to return to work, or to care for his/her family. The department will be responsible for long-term disability payments. Of greater concern is the possibility of a fatal infection. There are 200

deaths each year in the United States from occupationally acquired hepatitis B infections.

Ongoing evaluation is another component of health maintenance. Yearly medical reassessment (periodic reassessment) of all members engaged in emergency operations is required by NFPA 1500. Members returning to duty after serious illness or injury should have a medical reassessment prior to resuming work (episodic reassessment). Supervisors should determine if members are fit to work at the start of each shift. Sometimes temporary work restrictions must be made because of infection control concerns. Examples would be members with open wounds on their hands, or with communicable diseases such as chickenpox. The department infection control program should make allowances for work restriction.

The final health maintenance requirement is the member assistance program. NFPA 1500 defines a member assistance program as "A generic term used to describe the various methods used in the workplace for the control of alcohol and other substance abuse, stress, and personal problems that adversely affect job performance." This includes critical incident stress debriefing. Exposure or even possible exposure to a communicable disease such as HIV can be a real source of stress for department members and their families. A system to deal with this stress should be part of the infection control plan. As with other medical records, participation in member assistance programs should be considered confidential medical information.

Incident Operations and Recovery

Infection control protocols must cover all aspects of emergency response. This includes preparation prior to response and cleanup after emergency response.

Pre-response SOPs should include a mechanism to insure that members are properly trained in infection control, are healthy, and have had appropriate medical screening and immunizations before being allowed to respond. Members with open wounds or cuts should cover these areas prior to response. The selection and purchase of PPE would normally be covered in other SOPs, but the proper storage and maintenance of PPE on the response vehicles should be specified in the pre-response SOP.

Operation at the emergency scene presents the highest risk for member exposure. Specific SOPs should address the concept of body surface isolation (BSI), the proper selection and use of PPE, including airway adjunctive devices, and the safe handling of sharps. All patients should be assumed to be infectious. Needles should never be recapped. Contaminated sharps should be placed in an appropriate container for later disposal. All emergency operations should be carried out with safety foremost in mind and with the minimum crew exposure needed to complete the task safely. Eating, drinking, or smoking should not be allowed at the scene. Protocols should address the safe removal and disposal of PPE, and the need for handwashing, both at the scene and after return to quarters. Soap and water and/or waterless handwashing solution should always be available on-scene.

Scene management also includes public relations and education. The use of gloves, gowns, and masks by members may frighten or anger victims or bystanders. A victim may ask: "Do you think that I have AIDS?" It is important to convey the fact that PPE is used on all calls to protect both members and the victims that they treat. SOPs should address a consistent way of making this information known.

Post-response SOPs must cover the cleaning, disinfection, and sterilization, of reusable patient care equipment, the proper maintenance and storage of PPE, and the disposal of biohazardous waste. To develop these procedures, it is necessary to know the specific manufacturer's guidelines.

The department must decide what level of decontamination will be provided in-house. **Cleaning** is the physical removal of dirt and debris, usually with soap and water. **Disinfection** is the reduction of the number of disease-producing organisms by physical or chemical means. **Sterilization** is the complete destruction of all micro-organisms, usually by steam or gas. High level disinfection is the use of special chemical liquids to achieve sterilization. Disinfection and high level disinfection use strong chemicals, which require appropriate SOPS for safe use, mixing, storage, and disposal. The material safety data sheets (MSDS) should be consulted for guidelines on safe operating practices, including PPE required.

Sterilization usually uses special equipment not available in the station. Equipment requiring high level disinfection or sterilization may be more easily handled at a central supply point or at a local hospital. Keep in mind that local or state law may require in-house quality assurance checks if you perform your own sterilization or high level disinfection.

After the response, personal protective equipment must be cleaned, inspected, and properly stored. The SOPs should address proper inventory levels of disposable PPE. Procedures should be developed to rotate stock properly and to monitor shelf life. Separate storage areas should be used for PPE, clean and dirty patient care equipment, and biohazardous waste.

Contaminated disposable equipment (patient care or PPE) and biohazardous waste (sharps) require special storage and disposal. A secure station area for biohazardous waste, away from the living areas, must be designated and appropriately secured. The requirements of local and state laws should be considered when designing this part of the infection control plan. It goes without saying that biohazardous waste must be disposed of in a legal and approved manner.

Post-Exposure

Both actual and perceived exposure to communicable disease may adversely affect the health of members. A post-exposure system establishes effective procedures to protect the health of members including: 1) notification of the chain of command of a possible exposure; 2) a verification process to decide if the exposure poses a danger to the members' physical or emotional health; 3) appropriate medical treatment; and 4) careful documentation of the incident.

Notification and verification practices must be spelled out in department SOPs. With the advent of the Ryan White Comprehensive AIDS Resources Emergency Act of 1990, each department needs a "Designated Officer" to assist in the verification process.

Treatment following communicable disease exposure includes prophylaxis, counselling, and follow-up care. Prophylaxis is therapy given to reduce the chance of contracting a communicable disease. Some examples are hepatitis B immune globulin (HBIG), given after exposure to hepatitis B in non-immune members, zidovudine (AZT) given after HIV exposure, or rifampin given after exposure to bacterial meningitis. Treatment protocols are frequently updated, and the timing and urgency of prophylaxis differs with different diseases. It is important that department SOPs reflect the most current medical information.

Counselling often is needed following actual or perceived exposure. This may include stress management, infection control education (real versus perceived exposure), methods to reduce disease spread (example: safer sex practices) and spousal or family counselling.

A system to document communicable disease exposure and treatment given is essential. Such a system protects the member and the department, and is an OSHA requirement. Disability, insurance claims, and defense of litigation all depend on the, proper documentation of exposures. All member medical records, including exposure documentation are considered strictly confidential information. Nothing in a member's medical record should ever be released without the member's written permission, even to his or her own physician or insurance company. It's a good idea to keep medical records and personnel records separated. OSHA requires long-term maintenance of exposure records.

Station Issues

The job is not finished once the crew returns to quarters. Infection control is an important aspect of station life. At different times the station functions as a restaurant, a hotel, a vehicle repair shop, and a storage site for medical waste. Infection control policies must address all of these activities. Local or state ordinances may regulate these activities and should be examined when designing the department infection control program.

Kitchen SOPs should include the proper preparation and storage of food, the recommended temperature settings for refrigerators and freezers, and the effective cleaning and storage of dishes and utensils. Food should be properly stored if the meal is interrupted by an alarm. Kitchen sinks should never be used to decontaminate EMS equipment. The SOPs also should address kitchen design. Kitchens should have double sinks and dishwashers. Countertops and cutting boards should be made of nonporous materials. If retrofitting is not feasible, these changes should be incorporated into future station design.

Sleeping quarters should be appropriately heated/cooled and ventilated, with a minimum of sixty square feet of floor space per bed.

Bathrooms should have push-to-open doors (no handles) and sinks that are not hand operated (foot or elbow controls).

A washerdryer should be available. SOPs should specify that soiled work uniforms be washed in quarters. Members should not clean soiled work uniforms at home. Extra clean, dry uniforms should always be available.

If emergency medical or patient care equipment is stored or decontaminated on site, there should be separate rooms (or at least separate areas) for disinfection and cleaning, storage of clean equipment, and storage of biohazardous waste (sharps containers). Equipment decontamination and biohazardous waste storage may be subject to state or local regulation. Written SOPs for the decontamination and storage of patient care equipment, and the disposal of biohazardous waste are required.

PROGRAM COMPONENTS/OPERATIONAL REQUIREMENTS ADDRESSED BY LAWS, STANDARD AND GUIDELINES

	Ryan White Act	OSHA 1910. 1030	OSHA 1910. 20	NFPA 1500	NFPA 1501	NFPA 1001	NFPA 1581
Department health/ safety plan				X	X		
Department IC program		X		X			X
Health database/ medical records		X	X	X	X		X
Training	X	X		X			X
Heath maintenance--							
Pre-entry				X		X	
Episodic/Periodic reassessment				X			
Member Assistance Program				X			
Immunizations		X		X			X
Post-exposure program	X	X		X			X
Scene management							
Operations		X		X	X		X
PPE		X		X			X
Cleanup/Disposal		X					X
Station issues		X		X			X

SUMMARY

The department infection control program is designed to protect the health of the members. Implementation of the program will also protect the department against related liability. For these reasons, it is important to examine federal, state, and local statutes affecting infection control/environmental issue when designing the program to ensure compliance.

Critical components of a comprehensive infection control program are: (1) a written policy statement; (2) an exposure control plan; (3) infection control SOPs; an information management system; (4) a training/education program; (5) compliance and quality monitoring processes; and (8) a program evaluation system.

The program must provide specific policies and SOPs for essential areas, including health maintenance,-incident operations and recovery, post-exposure, and station issues. Specific program components/operational. requirements addressed by current laws, standards, and guidelines are detailed in the matrix above.

It is important to realize that infection control is a rapidly expanding field. As new knowledge is gained, the laws, standards, and regulations based on this knowledge will undoubtedly change. The department Infection Control Officer needs to keep up-to-date on both medical and legal changes. The department plan must be reviewed and revised at appropriate intervals.

SECTION II

BUILDING AN INFECTION CONTROL PROGRAM

CHAPTER 3

DEVELOPING ORGANIZATIONAL SUPPORT

DEVELOPING ORGANIZATIONAL SUPPORT

This chapter discusses the importance of laying the groundwork for an infection control program. Organizational members as well as external decisionmakers must be convinced that such a program is needed. Suggestions are provided on specific strategies for promoting support for the program.

TYPICAL OBSTACLES

"Hey Jake, what happened to you?" "What are *you talking about, Paul?" "What's all that blood on your amrs and clothes, Jake?" "Oh that, I was on a trauma code a few hours ago. I guess / didn't clean a// of that stuff off very we//."*

"Jake!! what do you mean you didn't clean up very well? Don't you understand how diseases are transmitted? That stuff can make you very sick, or worse, you could transmit a disease to a patient on the next call or a family member when you get home. Now I'm telling you--GO CLEAN UP!"

"Paul, wait a minute, since when do you tell me what to do? You're not my boss! If it were so important to clean up after medical calls, don't you think that the department would have a written procedure? Wouldn't the city provide vaccinations and other protective gear for infection control? Don't make a' big deal over nothing. Your fears are unfounded, so stop worrying about me. And, anyway, I kinda like looking like a real vet.. . . "

"Look, Jake, it & a big deal! I've tried to get the department to develop an infection control program, but management won't listen. We can't wait for them to wise up, we have to look out for ourselves!"

The preceding scenario illustrates two typical organizational obstacles to developing an infection control program: lack of accurate information about disease transmission and management resistance to implementing effective infection control techniques/procedures.

Obviously, if department personnel are uninformed about the potential for occupational exposure to communicable diseases, or have a bad attitude about infection control there will be little organizational success in implementing a formal program.

Low management priority for developing written infection control policies and procedures may be caused by the same lack of accurate information, but more often it is due to an unwillingness to propose a new initiative which will require additional budget allocations. The current public expectation of "more service for less money" makes most emergency service managers reluctant to propose budget increases for needed program improvements.

Such obstacles are compounded by the emotional reactions usually triggered by discussions about communicable disease transmission and/or infection control requirements. People are normally reluctant to face up to potential health risks: most prefer to believe "it won't happen to me!" The combination of fear and misinformation creates a critical impediment to program implementation.

RECOMMENDED STRATEGY

The emergency manager who wishes to develop and implement an infection control program must begin by "selling" the program to various constituent groups inside and outside the organization. For best results, it is important to take an organized, systematic approach.

Consider forming a committee to help design and implement a marketing strategy. Seek out infection control advocates from all parts of the organization (line personnel, supervisors, managers, union representatives, etc.), and establish an "Infection Control Support Team/Task Force." Use this support group as an internal "sales force" to help develop organizational support for the program. They should use every opportunity--formal and informal--to promote the development of an infection control program to both management and fire personnel.

Develop a formal "marketing plan"--a detailed (written) summary of the steps required to build internal and external support for an infection control program. It should:

- Identify existing "obstacles," both inside and outside the organization. These obstacles

may Include resistance to change, budget concerns, or logistics problems.

- Define specific strategies for eliminating each identified obstacle.
- Delineate specific constituent groups who need to be "converted," e.g., department personnel (supervisors, managers, emergency responders, etc.), the public, elected officials, union leaders, etc.
- identify specific strategies for effectively communicating with each constituent group.

TOOLS FOR PROMOTING INFECTION CONTROL

Specific marketing strategies and objectives will vary from jurisdiction to jurisdiction, depending on unique local needs and expected level of resistance to the program. However, there are several concepts which provide a solid foundation for any attempt to develop support for an infection control program:

- Awareness of personal safety implications.
- legal and regulatory requirements.
- Organizational and personal liability considerations.

PERSONAL SAFETY IMPLICATIONS

Any marketing effort designed to develop support for an infection control program must convince department members, external decisionmakers, and the public that occupationally transmitted communicable diseases pose a serious threat to emergency response personnel. To accomplish this, it is necessary to gather relevant data which clearly demonstrates the need for an infection control program.

Begin by analyzing data already available within the department, such as number of exposures, needle-stick injuries, etc. (See Chapter 6 for a detailed discussion of data collection requirements.) Case studies of actual incidents are often very helpful for making the statistics "real" to different audiences.

Then seek out additional data from external sources, e.g., national statistics on communicable diseases, local health trends, high-risk incidents and populations, etc. (See Appendix D for a detailed listing of "sources of information.") Contact other emergency service organizations in order to develop baseline data for comparative purposes.

Use the data you've collected to develop a clear and convincing message that the risk is real and that a formal program is required in order to maximize the personal safety of all emergency responders. Stress the benefits which will accrue from the program, including:

- Protection of emergency responders and their families from communicable disease.
- Improved patient care.
- Better morale (reduction of fear, improved station life, reassurance of family members, etc.).
- Reduced costs (the high long-term costs of disability claims far out-weigh the relatively low short-term costs of program implementation).

LEGAL AND REGULATORY REQUIREMENTS

The marketing strategy should also emphasize that implementation of an infection control program assures compliance with relevant laws, standards, and guidelines. This is particularly important when attempting to get the support of elected officials and/or municipal administrators.

Chapter 2 provides a detailed summary of current national regulations, standards, and guidelines related to infection control. Many of these documents are contained in Appendix B; sources for other documents are listed in Appendix D.

Enlist the help of the agency's legal counsel in researching additional state and local regulations which require compliance. Local public health officials and state occupational safety and health agency officials can also provide information on these requirements.

LIABILITY CONSIDERATIONS

Making others aware of potential liability is another powerful way to convince them of the need for an infection control program.

Recognized national publications, such as NFPA Standards and CDC Guidelines, are used by the judicial system to determine an acceptable "standard of care" for emergency response personnel. Failure to provide the level of care/precautions recommended by such documents creates potential liability for the individual responder and the organization as a whole.

The marketing approach should emphasize the importance of an infection control program in minimizing potential personal/organizational liability.

SUMMARY

Developing support for an infection control program requires a systematic approach. Research is required to assure a realistic assessment of obstacles which need to be overcome in order to justify program implementation. In short, know the problem and be able to back up your statements.

All those affected by the program, whether inside or outside the organization, must be convinced that a need exists. This can best be accomplished by carefully explaining personal safety risks, legal/regulatory requirements, and personal/organizational liability potential.

Convince them that the development of an infection control program is in their best interest as well as that of the members--a true win-win situation.

CHAPTER 4

PLANNING, DEVELOPMENT, AND IMPLEMENTATION

PLANNING, DEVELOPMENT, AND IMPLEMENTATION

A successful marketing effort, as described in the preceding chapter, should convince all affected persons that a need exists for a comprehensive infection control program. This chapter provides specific recommendations on how to make such a program a reality.

A fourteen-step planning and development process provides the emergency manager with detailed guidelines for assuring an effective program. Example components of a "typical" program are included throughout the chapter. Since every department is different, these examples are not intended to be used as an "off the shelf" program. Rather, a custom program, reflecting your specific situation and requirements, should be developed.

STEP 1 - ESTABLISH AN INFECTION CONTROL ADVISORY COMMITTEE

Despite the name "advisory," this committee will do much of the actual work in developing the program. For this reason, if possible, choose members who will yes rather than just "advise." The committee should include individuals from: department administration, training, safety, operations, and EMS; health services; finance; legal services; and public health. Be sure to include representatives of member organizations (firefighter and officer unions).

Individuals outside the organization may have specific expertise, support mechanisms, or financial or political influence that may be necessary to "sell" the program. Such persons may be included on the committee or consulted as necessary. Designate someone to lead the committee and someone to keep the rest of the department informed on the progress of the committee.

Once the infection control program is completed and functioning, an Infection Control Committee will be necessary to steer and periodically reevaluate the program. This committee may be the same as the original advisory committee or may include new members.

STEP 2 - DO YOUR HOMEWORK

At this point, some committee members will probably be up-to-date on infection control issues. The rest of the committee, however, may have no idea of what is involved. Everyone should read and be familiar with, at the least, the USFA *Guide, The Ryan White Comprehensive AIDS Resources Emergency Act of 1990 (* PL 101-381), applicable OSHA and EPA regulations, relevant NFPA standards, and the most recent Centers for Disease Control (CDC) guidelines on Universal Precautions and HIv/HBV protection. The appendix of this Guide is a good place to start.

Next, committee members must research any local or state regulations that may impact on infection control or storage and disposal of biohazard wastes. The department legal counsel can assist here. Thorough research at this stage eliminates the potential of someone pointing out that your new infection control program does not meet the requirements of "law x" three months after the program is started.

STEP 3 - CONDUCT A NEEDS ASSESSMENT

If you followed the suggestions on developing organizational support provided in Chapter 3, some of this work may already be done. Statistics on your present injury and exposure rates, sick time and overtime costs, and medical and insurance expenses should have been collected as a selling point in developing organizational support. If not, collect them now, and also gather data from other departments of similar size and makeup in your area. This "baseline" data will become the cornerstone of your quality assurance and program evaluation efforts after the infection control program is functioning. Annual reassessment of these data should show a decrease in injuries, illnesses, and exposures, which will provide effective justification for the program at budget time.

STEP 4 - DON'T REINVENT THE WHEEL

Since most emergency service agencies are now concerned about infection control, the chances are good that another department in your area is developing or has already developed an infection control program. Check with the emergency services of cities similar to your own or within your mutual-aid organization. You may be able to modify an existing program to fit your own needs.

Another option is to link resources with other departments and develop a regional plan. At the least, examine other infection control programs to pick up any good ideas that may work for your specific situation.

STEP 5 - IDENTIFY GOALS AND OBJECTIVES, AND DECIDE HOW BEST TO ACCOMPLISH THEM

The Infection Control Advisory Committee must define the program goals and objectives, identify appropriate strategies, and incorporate them into an action agenda. Obviously, the overall goal is to protect members from communicable disease. This step determines how (and by whom) this will be accomplished. Strategies should cover issues of member training, public awareness campaigns, detailed standard operating procedures, and administrative concerns.

It is important to solicit input from the members at this point. Find people with "street experience" and make sure that the goals and objectives selected by the committee are both realistic and necessary. Involving the members in this process will ensure that no aspect of emergency response is overlooked. In addition, it is easier to accomplish organizational change when members have contributed to the design process.

Once the goals and objectives have been finalized, the committee should develop a detailed action plan for each objective which outlines necessary tasks, person(s) responsible, and target completion dates.

STEP 6 - DEVELOP A POLICY STATEMENT

A policy statement lets the members know that the department considers infection control to be an important issue.

The written policy statement should clearly define the purpose, scope, and philosophy of the infection control program.

SAMPLE

INFECTION CONTROL PROGRAM

POLICY STATEMENT

Purpose: To provide a comprehensive infection control system which maximizes protection agains communicable diseases for all members, and for the public that they serve.

Scope: This policy applies to all members, career and volunteer, providing fire, rescue, or emergency medical services.

This department recognizes that communicable disease exposure is an occupational health hazard Communicable disease transmission is possible during any aspect of emergency response, including in-station operations. The health and welfare of each member is a joint concern of the member, the chain of command, and this department. While each member is ultimately responsible for his or he own health, the department recognizes a responsibility to provide as safe a workplace as possible The goal of this program is to provide all members with the best available protection from occupationally acquired communicable disease.

is the policy of this department:

- To provide fire, rescue, and emergency medical services to the public without regard to known or suspected diagnoses of communicable disease in any patient.
- To regard all patient contacts as potentially infectious. Universal Precautions will be observed at al times and will be expanded to include all body fluids and other potentially infectious material (body) substance isolation).
- To provide all members with the necessary training, immunizations, and personal protective equipment (PPE) needed for protection from communicable diseases.
- To recognize the need for work restrictions based on infection control concerns.
- To encourage participation in member assistance and CISD programs.
- To prohibit discrimination of any member for health reasons, including infection and/or seroconversion with HIV or HBV virus.
- To regard all medical information as strictly confidential. No member health information will be released without the signed written consent of the member.

STEP 7 - DEVELOP AN EXPOSURE CONTROL PLAN

An exposure control plan is an OSHA requirement under 29 CFR Part 1910.1030. The purpose of the plan is to identify organizational tasks and procedures which might involve employee exposure to blood, body fluids, or other potentially infectious materials. Employees in job classifications which include such risks or procedures must, therefore, receive infection control training, and the employer must provide appropriate vaccinations and PPE. The plan must also establish an implementation process/schedule and must define exposure evaluation procedures.

A sample Exposure Control Plan is provided below. The sample plan emphasizes the fact that all emergency personnel are at risk.

SAMPLE

EXPOSURE CONTROL PLAN

Purpose: To identify those tasks and corresponding job classifications for which it can be reasonably anticipated that an exposure to blood, other body fluids, or other potentially infectious materials may occur; to establish a schedule for implementation of the department's infection control plan; and to identify the procedure for the evaluation o circumstances surrounding exposure incidents.

I. Exposure Determination

A. The following tasks are reasonably anticipated to involve exposure to blood, body] fluids, or other potentially infectious materials:

- Provisions of emergency medical care to injured or ill patients;
- Rescue of victims from hostile environments, including burning structures or vehicles, water contaminated atmospheres, or oxygen deficien atmospheres;
- Extrication of persons from vehicles, machinery, or collapsed excavations or structures;
- Recovery and/or removal of bodies from any situation cited above; and
- Response to hazardous materials emergencies, both transportation and fixed-site, involving potentially infectious substances.

B. The following job classifications are reasonably anticipated to involve exposure to blood, body fluids, or other potentially infectious substances in the performance o their duties:

firefighter
first responder
emergency medical technician
paramedic
driver/operator
company officer
field supervisor
hazardous materials response team member
specialized rescue technician
other emergency response personnel not otherwise classified

SAMPLE (cont'd)

EXPOSURE CONTROL PLAN

II. Implementation

The Infection Control Program is applicable to all members, career and volunteer, providing fire, rescue, or emergency medical services. It is effective immediately.

The Infection Control Program consists of a policy statement identification of roles and responsibilities, Standard Operating Procedures (SOPs), training, and recordkeeping. SOPs identify specific procedural guidelines for all aspects of response and station environments where disease transmission can be reasonably anticipated, as well as training, administrative aspects of the program, and post-exposure evaluation/investigation. Specific program components are identified as follows:

Infection Control Policy Statement
Exposure Control Plan
Infection control roles and responsibilities

SOP #IC 1: Health Maintenance
SOP #IC 2: Infection Control Training
SOP #IC 3: Station Environment
SOP #IC 4: Personal Protective Equipment
SOP #IC 5: Scene Operations
SOP #IC 6: Post-Response
SOP #IC 7: Post-Exposure Protocols
SOP #IC 8: Compliance and Quality Monitoring/Program Evaluation

Health/Medical, training, and post-exposure recordkeeping and documentation requirements are addressed in the corresponding SOPs.

III. Evaluation of Exposure Incidents

The procedure for the evaluation/investigation of circumstances surrounding incidents of exposure to blood, other body fluids, or other potentially infectious materials is detailed in SOP #IC 7: Post Exposure protocols. Medical followup, documentation, recordkeeping, and confidentiality requirements are also defined in SOP #IC 7.

STEP 8 - DEFINE RESPONSIBILITIES

Many different individuals and groups play roles in assuring the effectiveness of the infection control program. Prior to the official implementation of the program, each role should be clearly defined. Role definition must spell out specific areas of responsibility and accountability throughout the organization, Naturally, specific role definitions will vary in each department, depending on organizational structure, available resources, and program requirements. Typical titles and areas of responsibility are described below.

CHIEF OF DEPARTMENT

Although the chief of department may have little direct involvement in routine operations, he/she retains ultimate responsibility for the health and welfare of all members.

The chief is responsible for assuring the availability of all resources required for the program to function effectively, including adequate funding for training, procurement of equipment and supplies, and health maintenance activities. He/She also must assure sufficient personnel to accomplish program requirements.

Finally, after delineating the authority and responsibilities of each position in the program, the chief must hold each person accountable for assigned functions.

SAFETY OFFICER

In addition to duties described in NFPA 1501-1987, the designated department safety officer must be actively involved in the infection control program. He or she should be a member of the Infection Control Committee.

Depending on the size of the department, it may be appropriate for the Safety Officer to assume the additional responsibilities of the Infection Control Officer. (See below for a complete description of this position.) If this is not feasible, coordination between the Safety Officer and the Infection Control Officer is critical.

INFECTION CONTROL OFFICER

The Ryan White Comprehensive AIDS Resources Emergency Act of 1990 requires each department to name a “designated officer.” Thus, one of the primary responsibilities of the Infection Control Officer is to serve as a liaison between the department and the treating facility in an actual or suspected exposure, as required by the Act. (See Chapter 2 for a full explanation.)

The Infection Control Officer should be a member of the Infection Control Committee. In addition to coordinating exposure-related requirements, the Infection Control Officer should have primary responsibility for assuring the availability of appropriate personal protective equipment, monitoring compliance and quality assurance throughout the department, and maintaining required infection control records.

INFECTION CONTROL COMMITTEE

This committee is responsible for periodic review and revision of the program. As stated earlier, committee membership may include some or all of the original advisory committee.

The committee also should play a leading role in the identification of new technologies and/or procedures. Infection control is an emerging concept and new discoveries occur regularly; thus, the committee must keep abreast of changing conditions and new information in order to keep the program up to date.

TRAINING OFFICER

The training officer is responsible for ensuring that all members possess the necessary knowledge and skills required to perform their assigned tasks safely and to meet the standards of the program.

Program managers must receive an overview of the entire program. Supervisors need training in the SOPs, compliance monitoring and reporting systems, recordkeeping requirements, and supplies and equipment inventory procedures. Emergency responders require training on each component of the program.

Once the protocol has been completed, the training officer must provide appropriate training for all affected personnel. Required tasks will include:

- Assessing training requirements and evaluating existing or available training and materials.
- Designing lesson plans and student materials and identifying appropriate instructional methodologies (lectures, demonstrations, hands-on applications, etc.).
- Scheduling (when, where, how long) and administering training activities.
- Selecting instructors, if assistance is required.
- Testing/Evaluating member comprehension.
- Maintaining accurate and complete records of all training provided.

Finally, the training officer has responsibility for budget analysis and projection. Accurate cost estimates for all phases of the training program are critical in assuring availability of required funding.

- Personnel costs (number of trainees x trainees' hourly rates x number of hours).
- Instructional costs.
- Materials/Supplies costs.

DEPARTMENT PHYSICIAN

The department physician is responsible for developing and directing a comprehensive health maintenance system for all emergency response personnel (pre-entry and ongoing health assessment, immunizations, post-exposure procedures, and member assistance programs).

The department physician is responsible for guiding, directing, and advising members in regard to their health and fitness to perform assigned duties. As a member of the Infection Control Advisory Committee, he/she will play a key role in the development of department protocols,

The physician also serves as a resource to the Infection Control Officer, particularly in assessing potential exposure incidents. He/She should be available for consultation and counseling following member exposures in order to provide objective information regarding risk of disease based on specific type of exposure, potential risk to members' families (if any), recommended follow-up treatment (if needed), and possible long-term effects of the disease and/or prophylactic therapy. Maintaining confidentiality is an important responsibility of the fire department physician.

The position of department physician may be filled with one or more full-time doctors, but more commonly is a part-time or possibly a volunteer post. The department physician must be familiar with the tasks expected of, and the hazards faced, by emergency responders. Full-time physicians can perform all medical examinations, immunizations, and data management. A part-time department physician will not have time to do this: instead he or she can organize and supervise the program. This includes development of specific examination protocols and forms, and collection and maintenance of health data. Other agencies (city clinic or Board of Health, members' family physicians, freestanding clinics) can perform the examinations/immunizations, using the department protocols and forms. If this approach is used, all medical records should be maintained by the department physician, and a common laboratory should be used for all testing.

ATTORNEY

The attorney is responsible for reviewing the final program prior to implementation. This ensures that all prescribed measures are legal, non-discriminatory, and in compliance with applicable contemporary regulations.

The attorney may be part of the city/county attorney's off ice or may be a private legal counsel retained by the department.

The legal review process helps insulate and protect both the organization and all those who participate in the construction of protocols from any legal liability, should flaws in the design of the program exist.

MANAGERS AND SUPERVISORS

Managers and supervisors throughout the department are responsible for supporting the infection control program and for assuring compliance by each member. Effective leadership/supervision is a prerequisite for effective infection control.

First-line supervisors play a critical role in any infection control program. Probably the most important responsibility of a first-line supervisor is to serve as a positive role model. The supervisor's personal attitudes and behaviors have a profound influence on the actions of peers and subordinates.

Supervisors also play a key role in compliance/quality monitoring, particularly in the areas of:

- Health maintenance (assessing member fitness for duty: verifying required immunizations and examinations; etc.).
- Notification and documentation of exposures.
- Storage, maintenance, and availability of all necessary supplies and equipment.
- Training.
- Decontamination and waste disposal.
- Proper use of PPE.

Finally, the first-line supervisor has a public relations responsibility. Quite often infection control procedures at an emergency incident create fear and/or resentment in patients and observers. The supervisor must be able to respond to such reactions sensitively and objectively without compromising the confidentiality of patient medical information,

EMERGENCY RESPONSE PERSONNEL

All emergency response personnel bear individual responsibility for their own health and safety. Thus, they are responsible for complying with all established departmental guidelines and procedures, including safe work practices.

Each emergency responder must ensure his/her own protection against occupational exposures by:

- Participating in available health maintenance programs (annual physicals, immunizations, etc.).
- Practicing good personal hygiene.
- Reporting any personal medical condition which might require work restrictions.
- Following infection control protocols at the emergency scene.
- Reporting and documenting all exposures; complying with recommended follow-up treatment.
- Assuring proper decontamination of equipment after each incident, and proper storage/disposal of contaminated waste.

ROLE SUMMARY

Depending on the size of the department, some of the individual positions described above may be combined and assigned to a single individual. Obviously, smaller departments will have fewer officers taking on more responsibilities. For example, in a volunteer company with only one engine and a BLS ambulance, the ambulance lieutenant may also be the Safety Officer and the Infection Control Officer. The important point is not <u>how many positions</u> there are, but, rather, assuring that all required <u>functions</u> have been assigned to specific individuals,

An example designation of assigned roles and responsibilities is provided on the following pages. The. example is for a large career department providing fire and advanced life support services. For convenience, the functions of the Infection Control Committee have been assigned to the Safety Committee; however, two separate committees would also work.

SAMPLE

INFECTION CONTROL

ROLES AND RESPONSIBILITIES

1) Chief of Department

The tasks of managing the department Occupational Health & Safety and Infection Control programs are delegated to appropriate staff officers and committees as noted below. The ultimate responsibility or the health and welfare of all members remains that of the Chief of Department.

2) Safety Officer

The Safety Officer, in addition to duties described in NFPA 1501-1987, will serve as co-chair of the Department Occupational Health and Safety Committee. The Safety Officer will assume the duties of he Infection Control Officer when the latter is unavailable.

3) Occupational Health and Safety Committee (Safety Committee)

the Safety Committee presently consists of:

Co-Chairs: Chief of Department
Safety Officer

Department Physician
EMS Medical Director
Deputy Chief, Fire and Rescue
Deputy Chief, EMS Operations
Deputy Chief, Training
Representative, Firefighters Union
Representative, Fire Officers Union

This committee is modified by the addition of the department Infection Control Officer, as described below. The Safety Committee will assume the additional duties of Infection Control Committee, including periodic review and revision of the department Infection Control Program. The committee will meet monthly to discuss safety and infection control issues.

4) Department Infection Control Officer

The department Infection Control Officer will be appointed by the Chief of Department. This person must have five or more years of recent fire/EMS experience; be in the rank of captain or above; and possess current EMT-P (Paramedic) certification.

The Department Infection Control Officer will:

- Serve as the department “designated officer” as required by the *Ryan White Comprehensive AIDS Resources Act* of 1990 (PL 101-381).
- In conjunction with the Infection Control/Safety Committee, develop criteria for the purchase of infection control personal protective equipment and determine adequate stocking levels for each station and response vehicle.
- Evaluate possible member exposures to communicable diseases and coordinate communications between the department, area hospitals, and the City Board of Health.

SAMPLE (cont'd)

INFECTION CONTROL

ROLES AND RESPONSIBILITIES

- Collect quality assurance data on the department Infection Control Program and presen these data to the Infection Control/Safety Committee at monthly meetings.
- Notify the Department Safety Officer if quality assurance data indicate a safety hazard requiring immediate attention.
- Conduct spot inspections of on-scene and station operations to ensure compliance with department infection control policy.
- Coordinate the immunization program with the Department Physician and maintain immunization records at the office of the Department Physician.
- Maintain a confidential database of exposures and treatment given, in conjunction with the Department Physician.
- Provide technical expertise to the Division of Training in development of the infection contra curriculum.
- Keep abreast of new developments in the field of infection control and make appropriate recommendations to the Infection Control Committee.

5) Training Officer

In addition to existing duties, the Training Officer is responsible for the development and delivery of a comprehensive infection control educational program which complies with OSHA Regulation 29 CFR Part 1910.1030. Technical assistance will be provided by the Department Physician and the infection Control Officer.

6) Department Physician

The Department Physician is in charge of the Health Maintenance Program. Presently this program provides baseline and annual physicals and return-to-work determinations. The Departmen Physician, in conjunction with the Infection Control Officer will:

- Develop and implement an immunization program.
- Develop and implement a post-exposure program.
- Provide technical assistance and guidance to the Infection Control Program.
- Provide technical assistance and guidance in the development of appropriate infection Control training.
- Maintain confidentiality of all medical and exposure records.

7) City Attorney

The City Attorney will review the Infection Control Program, and each subsequent revision. The City Attorney will inform the Infection Control Committee of any new regulations (local, state, or federal that may impact on the Infection Control Program.

SAMPLE (cont'd)

INFECTION CONTROL

ROLES AND RESPONSIBILITIES

8) Department Managers and Supervisors

Chief Officers and Company Officers will:

- Support and enforce compliance with the Infection Control Program.
- Correct any unsafe acts, and refer members for remedial infection control training if required.
- Mandate safe operating practices on-scene and in-station.
- Refer for medical evaluation any member possibly unfit for work for infection control or other reasons.
- Company officers will not allow new members to assume emergency response duties until initial medical evaluation, immunizations, and infection control training have been completed.

9) Members

All members will:

Assume ultimate responsibility for own health and safety.

Always use appropriate PPE as the situation dictates.

Report any suspected occupational **exposure** to communicable disease to their company officer.

Report any **diagnosis** of communicable disease (occupational or nonoccupational) to the department Infection Control Officer).

STEP 9 - DEVELOP STANDARD OPERATING PROCEDURES (SOPS)

Standard operating procedures (SOPs) should be very specific and should cover all aspects of response, including station issues. **Any department activity where disease transmission is possible should be covered by a standard operating procedure.** While the number and type of required SOPs will vary according to the services provided (fire only; fire and BLS; fire, BLS, and ALS; etc.), the following guidelines should help you determine what is needed in your specific situation.

HEALTH MAINTENANCE

Regardless of the services provided, all departments should have an SOP on health maintenance. All health-related requirements and recommendations should be addressed. Consider including: pre-entry health assessment; ongoing health assessment; immunizations; work restrictions; return-to-work policies; recordkeeping; confidentiality of medical information/ records: and access to medical records.

INFECTION CONTROL TRAINING

Since all emergency response personnel are at risk for occupational exposures, all departments should have an SOP on infection control training.

NFPA 1581, *Standard on Fire Department infection Control Program* states:

> "The fire department shall conduct training and education programs for all members who are involved in emergency medical operations on infectious diseases that pose a potential occupational health risk. The training program shall include proper use of personal protective equipment, standard operating procedures for safe work practices in infection control, and proper methods of disposal of contaminated articles and medical waste. Information on applicable government regulations shall also be provided."

NFPA 1581 also includes a list of diseases which must be included in the training program.

OSHA Regulation 29 CFR Part 1910.1030 mandates that all employees at risk for occupational exposures receive infection control training at no cost and during working hours. This regulation also includes detailed requirements for specific components of the training program. (See Appendix for the complete text.)

The example training SOP (page 83) meets all of the requirements of 29 CFR 1910.1030.

STATION ENVIRONMENT

Before writing this SOP, check local ordinances regarding food service, building codes, and storage/disposal of biohazard waste. Then establish clear procedural requirements for decontamination of equipment and clothing; storage and disposal of biohazard waste; and storage of clean patient care equipment and PPE. In addition, provide specific policies regarding laundry areas, kitchens, bathrooms, and sleeping areas.

PERSONAL PROTECTIVE EQUIPMENT

Departments of all sizes and missions require an SOP for personal protective equipment. OSHA states that the employer is responsible for the provision, repair, replacement, cleaning/ disinfection, and proper disposal of PPE. The specific types of PPE required must be determined based on the situations emergency response personnel might be expected to encounter. For example, structural firefighting gear provides both barrier protection and protection against sharp edges. Gowns, shoe covers, and hats are impractical in many field situation, but may be useful in activities that are primarily medical, such as emergency childbirth.

The SOP should cover specifications purchase, storage, and issue of PPE. Clear guidance should be provided for which PPE is required/recommended in specific situations.

SCENE OPERATIONS

Every department needs an SOP covering infection control at the emergency scene.

Specific procedures should be included for any activity where communicable disease exposure is possible.

Obviously, departments which provide advanced life support will require the most detail in this area. However, basic infection control procedures are important in any emergency incident. Broken glass contaminated with blood can be just as dangerous as contaminated needles.

Procedures for use of PPE and handwashing apply to **all** emergency response personnel. Each person should carry a disposable pocket mask with one-way valve and disposable gloves, whether or not the department provides emergency medical services.

POST-RESPONSE

The post-response SOP should include specific instructions for the cleaning, decontamination, disinfection, or sterilization of any equipment used for EMS, rescue, or fire activities. The manufacturers' recommendations must be followed. A post-response SOP is required regardless of the size of department, or whether or not emergency medical serves are provided. Everyone should know how to remove blood from turnout gear.

POST-EXPOSURE

Post-exposure protocols are required for any size department, whether or not EMS activities are provided. Documentation of exposures, evaluation of circumstances surrounding exposures, and medical follow-up is an OSHA requirement. The Ryan White Act requires every employer of emergency response personnel to have a "designated officer." Specific medical protocols for care following communicable disease exposure should follow most recent CDC recommendations. These protocols need regular review and revisions based on current medical practice.

COMPLIANCE/QUALITY MONITORING AND PROGRAM EVALUATION

Evaluation is another SOP required by every department. Is the program really doing what you wanted? Are the SOPs being followed? Are the protocols too complicated? Only analysis of compliance/quality assurance data will tell you.

Periodic reevaluation will make sure that the program remains state-of-the-art, as medial knowledge changes and the legal climate becomes more complicated. Besides, periodic review is an OSHA requirement.

Compliance/Quality monitoring and program evaluation are discussed in detail in Chapters 6 and 7.

EXAMPLE SOPs

Example SOPs for each of the categories described are provided at the end of this chapter. All example SOPs assume that emergency medical services are provided. Although non-EMS department infection control SOPs may be less complex, they are still required. Even non-EMS departments require PPE and established procedures to protect members against blood exposure at fire or rescue scenes or when administering emergency first aid.

Example SOPs provided represent the ideal. It is recognized that departments cannot rebuild all existing facilities to comply with an Infection Control Program. However, compromises might include requiring compliance in new firehouse construction or at time of remodeling: designating one station as a decontamination and storage point for infectious waste; utilizing facilities of a local hospital for decontamination or disposal; or exchanging contaminated for clean EMS equipment at the local hospital.

Along the same line, example SOPs assume that the department has provided dishwashers, washing machines, and dryers in each station. In actual practice, many stations purchase dishwashers, washing machines, and dryers out of personal funds. This provides a short-term solution; however, the department should provide these items as a component of providing a safe workplace.

STEP 10 - INCLUDE AN APPENDIX

The final program should include an appendix which provides reference information for department personnel. Possible materials

include a bibliography; a glossary of common terms; copies of the most important laws/regulations/standards related to infection control; and sources of additional information. (See USFA *Guide* Appendix for specific ideas.)

STEP 11 - LEGAL REVIEW

When procedures are finalized, submit them for legal review. Usually this task is accomplished by the local municipal attorney or the legal counsel that your organization might have on retainer. Legal review helps insulate and protect the organization, its managers, and the team that constructed the protocols.

STEP 12 - ORGANIZATIONAL REVIEW AND FINAL MODIFICATIONS

As the committee becomes more involved in writing the Infection Control Program, it becomes more likely that something obvious will be overlooked. Having to publish a major revision two weeks after implementation will not inspire confidence in the program or its authors. Before final release, the plan should be reviewed by representative members and officers of the department, including those who will be responsible for program implementation. This will guard against major errors or omissions, allow impartial, and objective assessment, and facilitate acceptance of the program.

The Infection Control Program is now ready for the Chief's signature and for distribution throughout the department.

STEP 13 - REVISE OTHER DOCUMENTS/PROCEDURES

As emphasized in Step 9, well-defined SOPs provide clear notice to all employees regarding individual responsibility for safe work practices. But in order to hold all members accountable for compliance with established SOPs, other department documents/procedures must also be reviewed.

- Job descriptions should be reviewed and amended based on new tasks/responsibilities. If new positions have been staffed or if positions have been combined, revised job descriptions should be prepared. Each job description should thoroughly describe the duties and responsibilities of that position. The duty assignments can be used for determining the qualifications required to perform the job or to determine requirements for additional training.

- Promotional examinations should be revised to include infection control principles. Infection control reference texts/materials should be added to promotional exam bibliographies. This will motivate members to become familiar with the policy, procedures, and protocols of the program.

- Compliance with infection control SOPs should be included as a component of the performance appraisal process.

- The disciplinary action system must delineate specific disciplinary actions which will be taken for failure to comply with established procedures. All SOPs must be enforced consistently and fairly and be applied equally to all violations. Effective disciplinary procedures assist the department in reinforcing its commitment to protect the health of members and minimize potential liability.

STEP 14 - IMPLEMENT THE PROGRAM

Implementing the infection control program is not simply a matter of distributing SOPs to all members. All aspects of the program must be explained, and necessary support services must be set in motion.

POLICY STATEMENT

Prior to formal distribution of SOPs, the chief should prepare and circulate the written policy statement on infection control. This step is important because it precludes any misunderstanding by the members regarding the pending SOPs and the department's intentions. The policy statement should be openly posted at all stations and facilities, with copies issued to all officers to be read at roll calls or crew meetings.

DISTRIBUTION OF SOPS

The issuance of SOPs is integral to be success of the infection control program. Producing the best infection control protocol in the world does not good if members of the service do not have it, know it, and follow it. Two of the best techniques for issuance of SOPs are: (1) for career departments have the members sign for them on payday with their paycheck; and (2) for volunteer departments, distribute them to members at the general membership meeting with signature of attendance sheet as proof of receipt.

INITIAL TRAINING

Once the protocol has been received, the training officer must provide appropriate initial training for all affected personnel.

SUPPLIES AND EQUIPMENT

One of the most important decisions a department must make in implementing the program is identifying and procuring initial supplies and equipment. Many questions must be answered: What/How much do we need? How do we determine which products are best for the program? Who are the manufacturers? What is their reliability? Where can we go for assistance?

Product Evaluation

Each department should research requirements specified in local laws and/or regulations. National standards/recommendations should be consulted for guidance in making decisions on the types of equipment required for the program, e.g., OSHA regulations, NFPA standards, and CDC guidelines. Food and Drug Administration (FDA) requirements and ASTM standards can be incorporated into the specifications for the equipment to be purchased.

The next step is to establish a list of manufacturers of all required equipment. Review as many supply catalogues as possible. Contact other emergency services and health-care facilities for information on various manufacturers (reliability, quality, service, produce performance, etc.). Their field experience and product evaluations will facilitate a more informed decisionmaking process.

Beware of the “snake oil” sales representative. “We have the best disinfectant on the market. It kills everything we know about now and will take care of the others yet to come!” When dealing with sales people, remember that their bottom-line objective is to sell the product. Most are reliable but some are not. **Don’t accept claims about product performance at face value:** ask for user references with names and telephone contact numbers. Check these contacts out and learn from their experiences. Independent laboratory testing data also can be used to support claims.

Cost Evaluation

Cost evaluation is an important element in the procurement of supplies and equipment. All departments have budgetary constraints. An item-by-item analysis must be made to determine the total cost for all supplies and equipment.

In determining total costs you will have to consider the number of stations, number of vehicles, staffing, annual runs, and rates of usage. For example, a cost estimate for personal protective equipment can be made using the following formula:

(# of emergency responders) x (# of runs) x (PPE unit cost) x (individual usage rate per run) = cost estimate.

Issuing Equipment

The placement of supplies and equipment should be standard on all vehicles. The inventory supplied to each vehicle should be based on the number of members on the vehicle per shift, for example: number of resuscitation devices for every six emergency responders (two ERPs per shift, three shifts a day) or for every twelve responders (four per shift, three shifts per day). Issuing supplies to each station should be based on the work load of that station. Some stations will expend more supplies than others based on geographic location and service needs.

Ongoing Maintenance of Supplies and Equipment

Manufacturers will have specific requirements for the storage of supplies and equipment. This applies to both the station and the vehicle. For example, gloves and gowns may need to be stored away from certain chemicals and heat. Light and/or temperature may affect cleaning

solutions. The Material Safety Data Sheets and other information provided by the manufacturer should be consulted for further details.

Storage areas should be separated to ensure they are not contaminated in any way. In the event a separate area is not available, a secure locker or cabinet may be a suitable alternative.

Replacing and Rotating Supplies

Availability of supplies when needed is essential to an effective infection control program. If the necessary supplies are not available due to poor inventory control, members and patients could be placed at risk.

Time factors for placement of requisitions and delivery of the items must be considered. This includes noting usage levels and shelf life of each product.

The manufacturer's warranty limitations are important to identify the life of the product. Each product is different. Be aware that exceeding the shelf life or warranty limits could put members and patients at risk.

Ensure that stock Is checked on a regular basis for expiration dates, and move items that are soon to expire to the front. This must be closely monitored to prevent the use of defective or outdated equipment. Proper planning with regard to storage and shelf life will ensure effective stock use.

Recordkeeping Procedures

Inventory forms or an automated inventory management system should be used to monitor supplies on hand and expended items. This might be a daily function in a career department or weekly in a volunteer system. The inventory form should record the minimum quantity required to be on hand so proper requisitioning can be submitted in a timely manner.

The individual conducting the inventory should date and sign the form. The individual ordering the replacement supplies should also sign and date the form, noting that supplies were ordered. The receipt of supplies should be entered on the card along with date of receipt and signature of individual receiving items.

SUMMARY

This chapter outlined a fourteen-step process for planning, developing, and implementing a comprehensive infection control program. Example components of a typical program have been provided throughout the chapter; example SOPs are included on the following pages.

Hopefully, the example documents provided will serve as useful references which will be revised and/or expanded as necessary to meet unique local statutory/organizational requirements.

EXAMPLE

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP# IC 1: Health Maintenance

- No member will be assigned to emergency response duties until an entrance physical assessment has been performed by the Department Physician or his/her designee, and the member has' been certified as fit for duty.

- Work restrictions for reasons of infection control may be initiated by the Department Physician. These may be temporary or permanent. As an example, members with extensive dermatitis or open skin lesions on exposed areas may be restricted from providing patient care or handling and/or decontamination of patient care equipment.

- All members will be offered immunization against hepatitis B, influenza, measles, mumps, rubella, poliomyelitis (polio), tetanus, and diphtheria. The risks and benefits of immunization will be explained to all members, and informed consent obtained prior to immunization.

- A member may request serologic testing prior to hepatitis B immunization to determine if previous immunity exists. Members may refuse immunizations, or may submit proof 01 previous immunization. Members who refuse immunization will be counseled on the occupational risks of communicable disease, and required to sign a refusal of immunization form. Members who initially refuse immunization may later receive immunization upon request.

- All members will be offered initial and yearly screening for tuberculosis exposure.

- All members will receive annual health evaluations.

- Any member returning to work following debilitating injury or illness or communicable disease (occupational or nonoccupational) will be cleared by the Department Physician or designee prior to resuming emergency response duties.

- All members will receive an exit health evaluation upon being reassigned to nonemergency response duties.

- The Department Infection Control Officer and Physician will maintain records in accordance with OSHA's CFR 29, Part 1910.1030. Member participation in the Infection Control Program will be documented, including:

  - Name and SSN of member.
  - Immunization records.
  - Circumstances of exposure to communicable diseases.
  - Post-exposure medical evaluation, treatment, and follow-up.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 1: Health Maintenance (cont'd)

- Infection control records will become a part of the member's personal health file and will be maintained for duration of employment plus thirty (30) years.

- Medical records are strictly confidential. Medical records will be maintained in the off ice of the Department Physician, and will not be kept with personnel records. Medical records will not be released without the signed written consent of the member. There will be no exceptions to this policy for Department Administration, City Administration, or insurance companies.

- Records of participation in member assistance programs or critical incident stress debriefing are considered medical records.

- Members may examine their own medical records, and may request that copies be sent to their personal physician. Release of medical records to another physician will be made only with the signed written consent of the member.

- Abstracts of medical records without personal identifiers may be made for quality assurance, compliance monitoring, or program evaluation purposes, as long as the identity of individual members cannot be determined from the abstract.

- Communications between medical and personnel sections will focus on fitness to work or recommended restrictions, rather than upon specified diagnoses.

To preserve member confidentiality, the EMS Medical Director will not conduct health assessments on department members.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 2: Infection Control Training

- All members providing emergency services will be required to complete:

  - Initial infection control training at the time of assignment to tasks where occupational exposure may occur. (Members presently assigned to such tasks who have not already received such training will complete initial training prior to June 6, 1992.

  - Refresher infection control training at least annually thereafter.

- All infection control training materials will be appropriate in content and vocabulary to the educational level, literacy, and language of members being trained.

- Training will be in compliance with NFPA Standard 1581 and OSHA Regulation 29 CFR Part 1910.1030 and shall include:

  - An accessible copy of 29 CFR Part 1910.1030 and an explanation of its contents.

  - A general explanation of the epidemiology and symptoms of bloodborne diseases;

  - An explanation of the modes of transmission of bloodborne pathogens;

  - An explanation of the department exposure control plan and how the employee can obtain a copy.

  - An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;

  - Information on the types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment;

  - An explanation of the basis for selection of personal protective equipment;

  - Information on the hepatitis B vaccine, including information on its efficacy, safety, and the benefits of being vaccinated; notification that the vaccine and vaccination will be provided at no charge.

  - Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.

  - An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.

  - Information on the post-exposure evaluation and follow-up that the department is required to provide following an exposure incident.

  - An explanation of the signs and labels and/or color coding required for biohazard materials; information on the proper storage and disposal of biohazard materials.

  - Opportunity for interactive questions and answers.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 2: infection Control Training (cont'd)

- Infection control trainers shall be knowledgeable in all of the program elements listed above, particularly as they relate to emergency services provided by this department.

- Written records of all training sessions will be maintained for three years after the date on which the training occurs. Training records will include:

  - The dates of the training sessions:

  - The contents or a summary of the training sessions;

  - The names and qualifications of persons conducting the training; and

  - The names and job titles of all persons attending the training sessions.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 3: Station Environment

- Storage, decontamination, and disposal areas:

  - All stations will designate separate, locked areas for:

    Equipment decontamination and disinfection.

    Storage of clean patient care equipment and infection control personal-protective equipment.

    Storage of biohazard waste.

  - Under no circumstances will kitchens, bathrooms, or living areas be used for decontamination or storage of patient care equipment or infectious waste.

  - Decontamination areas will be marked with biohazard signs and will be equipped with:

    Two sinks, constructed of nonporous materials, equipped with spray attachments and foot controls.

    Proper lighting and adequate ventilation.

    Adequate counter areas constructed of nonporous materials.

    Adequate rack space to allow airdrying of equipment.

    Appropriate containers for disposal of biohazard waste.

    Facilities for the safe storage, use, and disposal of cleansing and disinfecting solutions.

    Appropriate PPE for the use of disinfecting solutions.

    Material safety data sheets (MSDS) for cleansing and disinfecting solutions. All personnel using these solutions will be familiar with the MSDS and will use the recommended PPE.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 3: Station Envlronment (cont'd)

- Infectious waste storage areas will be marked with biohazard signs and will be maintained in accordance with all EPA and local regulations.

- Contaminated sharps will be stored in closed puncture-resistant containers (sharps boxes with appropriate biohazard markings and color coding.

Other contaminated materials will be stored in leakproof bags with appropriate biohazard markings and color coding.

If outside contamination of a disposal bag is a possibility, a second bag with identical markings will be placed over the first.

Reusable bins and containers used to store biohazard waste will be inspected cleaned, and disinfected weekly, and immediately if outside contamination is present

All disposal of biohazard waste will be in accordance with EPA and local regulations and will be performed by an approved licensed contractor designated by the department.

- Laundry area.

- All stations will maintain a clean laundry area with washer, dryer, and wash sink.

- All work uniforms will be washed in-station. **Under no circumstances will work clothes be washed at home by members.** This will help protect members' families from both infectious and chemical contamination.

All members will maintain extra clean work uniforms in the station, so that potentially contaminated uniforms can be exchanged upon return to quarters.

All linen used for patient transport is considered potentially contaminated Contaminated linen will be exchanged by the medical facility receiving the patient Contaminated linen will not be washed in station laundry facilities. Disposable glove: shall be worn when handling potentially contaminated linen.

- Kitchen.

- All kitchens will be equipped with double sinks constructed of nonporous materials.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 3: Station Environment (cont'd)

- Food preparation areas, counter tops, and cutting boards will be constructed of nonporous materials.

- Under no circumstances will any kitchen facility be used for the purpose of cleaning, sterilizing, disinfecting, storing, or disposal of any infectious material or waste.

- Therometers will be kept in all refrigerators and freezers. Refrigerators will maintain a temperature of 38°F or below, and freezers will maintain a temperature of O°F or below. Temperatures will be checked weekly by a member designated by the senior officer in each station.

- Food will be properly prepared and cooked. Hands will be washed before and after preparing food. Food will be returned to the refrigerator before leaving the station if a meal is interrupted by an alarm.

- All kitchens will be equipped with dishwashers.

• Bathrooms.

- Bathrooms will have push-to-open doors without handles.

- Sinks and toilets will operate with foot controls.

- Disposable handdrying materials will be used. Cloth towels will not be used.

• Sleeping 'areas.

- Adequate ventilation and HVAC system will be in safe condition.

- A minimum of sixty square feet of floor space per bed will be provided.

- Separate lockers will be provided for bedding materials and clothing.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 4: Personal Protective Equipment

- Specification, purchase, storage and issue of personal protective equipment (PPE).

  - Standards for personal protective equipment will be developed by the Infection Control Officer and the Infection Control Committee and updated or modified as needed.

  - The department Is responsible for the supply, repair, replacement, and safe disposal of infection control PPE.

  - The Infection Control Officer and Infection Control Committee will determine proper stock supply levels of PPE both for stations and for response vehicles.

  - The senior officer at each station will ensure that station stock of PPE is adequate and that supplies nearing expiration dates are used first.

  - The amount, type, and location of PPE will be standardized on all response vehicles.

  - Available PPE (in addition to PPE for structural firefighting) will include disposable gloves, rubber gloves for disinfection purposes, head covers, face masks, eye protectors, full face shields, fluid-impervious gowns, sharps containers, leakproof disposal bags, and shoe covers.

  - Disposable gloves will be constructed of latex rather than plastic. While both types provide equal protection, latex is more durable during on-scene operations.

  - Sharps containers will be closable, puncture resistant, and leakproof. Sharps containers will be color coded, labeled as a biohazard, and immediately accessible.

  - All members will be issued a pocket mask with one-way valve. Replacement pocket masks will be carried on every response vehicle and stocked in each station.

- Selection and use of personal protective equipment.

  - Emergency response often is unpredictable and uncontrollable. While blood is the single most important source of HIV and HBV infection in the workplace, in the field it is safest to assume that all body fluids are infectious. For this reason, PPE will be chosen to provide banter protection against all body fluids.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 4: Personal Protective Equipment (cont'd)

- In general, members should select PPE appropriate to the potential for spill, splash, or exposure to body fluids. No standard operating procedure or PPE ensemble can cover all situations. Common sense must be used. When in doubt, select maximal rather than minimal PPE.

- Disposable latex gloves will be worn during any patient contact when potential exists for contact with blood, body fluids, nonintact skin, or other infectious material. All members will carry extra pairs of disposable gloves in turnout coats and/or EMS jumpsuits.

- Gloves will be replaced as soon as possible when soiled, torn, or punctured. Wash hands after glove removal.

- Disposable latex gloves will not be reused or washed and disinfected for reuse.

- Where possible, gloves should be changed between patients in multiple casualty situations.

- Structural firefighting gloves will be worn in situations where sharp or rough edges are likely to be encountered.

- Heavy-duty utility gloves may be used for the handling, cleaning, decontamination, or disinfection of potentially contaminated patient care equipment.

Facial protection will be used in any situation where splash contact with the face is possible Facial protection may be afforded by using **both** a face mask and eye protection, or by using a full face shield. When treating a patient with a suspected or known airborne transmissible disease, face masks or particulate respirators will be used. The first choice is to mask the patient; if this is not feasible, mask the member(s).

- Face shields on structural firefighting helmets will not be used for infection control purposes

- Fluid-resistant gowns are designed to protect clothing from splashes. Structural firefighting gear also protects clothing from splashes and is preferable in fire, rescue, or vehicle extrication activities. Gowns may interfere with, or present a hazard to, the member in these circumstances. The decision to use barrier protection to protect clothing, and the type o barrier protection used will be left to the member. Structural firefighting gear will always be worn for fire suppression and extrication activities.

- Under certain circumstances, head covers and/or shoe covers will be required to protec these areas from potential contamination. Structural firefighting gear (impervious boots helmets) also may be used for barrier protection.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 4: Personal Protective Equipment (cont'd)

- Summary.

  - If it's wet, it's infectious - use gloves.

  - If it could splash onto your face, use eye shields and mask or full face shield.

  - If it's airborne, mask the patient or yourself.

  - If it could splash on your clothes, use a gown or structural firefighting gear.

  - If it could splash on your head or feet, use appropriate barrier protection.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 5: Scene Operations

- The blood, body fluids, and tissues of all patients are considered potentially infectious, and Universal Precautions/Body Substance Isolation procedures will be used for all patients contact.

- The choice of personal protective equipment is specified in SOP # IC 4. Members will be encouraged to use maximal rather than minimal PPE for each situation.

- While complete control of the emergency scene is not possible, scene operations as much as possible will attempt to limit splashing, spraying, or aerosolization of body fluids.

- The minimum number of members required to complete the task safely will be used for all on-scene operations. Members not immediately needed will remain a safe distance from operations where communicable disease exposure is possible or anticipated.

- Handwashing is the most important infection control procedure.

  Members will wash hands:

  - After removing PPE.

  - After each patient contact.

  - After handling potentially infectious materials.

  - After cleaning or decontaminating equipment.

  - After using the bathroom.

  - Before eating.

  - Before and after handling or preparing food.

- Handwashing with soap and water will be performed for ten to fifteen seconds. If soap and water is not available at the scene, a waterless handwash may be used, provided that a soap and water wash is performed immediately upon return to quarters or hospital.

- Eating, drinking, smoking, handling contact lenses, or applying cosmetics or lip balm is prohibited at the scene of operations.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 5: Scene Operations (cont'd)

- Used needles and other sharps shall be disposed of in approved sharps containers. Needles will not be recapped, resheathed, bent, broken, or separated from disposable syringes. The most common occupational blood exposure occurs when needles are recapped.

- Sharps containers will be easily accessible on-scene.

- Disposable resuscitation equipment will be used whenever possible. For CPR, the order of preference Is:

  1. Disposable bag-valve mask.

  2. Demand valve resuscitator with disposable mask.

  3. Disposable pocket mask with one-way valve.

  4. Mouth-to-mouth resuscitation.

- Mouth-to-mouth resuscitation will be performed only as a last resort if no other equipment is available. All members will be issued pocket masks with one-way valves to minimize the need for mouth-to-mouth resuscitation. Disposable resuscitation equipment will be kept readily available during on-scene operations.

- Patients with suspected airborne communicable diseases will be transported wearing a face mask or particulate respirator whenever possible. Ambulance windows will be open and ventilation systems turned on full whenever possible.

- Personal protective equipment will be removed after leaving the work area, and as soon as possible if contaminated. After use, all PPE will be placed in leakproof bags, color coded and marked as a biohazard, and transported back to the station for proper disposal.

- On-scene public relations will be handled by the Department Public Information Officer, if available. The senior line officer will assume this function in the absence of the Public Information Officer. The public should be reassured that infection control PPE is used as a matter of routine for the protection of all members and the victims that they treat. The use of PPE does not imply that a given victim may have a communicable disease.

- No medical information will be released on scene. Media queries will be referred to the Department Public Information Officer. Patient confidentiality will be maintained at all times.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 5: Scene Operations (cont'd)

- At conclusion of on-scene operations, all potentially contaminated patient care equipment will be removed for appropriate disposal or decontamination and reuse.

Note: This SOP covers only general infection control concerns. In addition, very specific SOPs should be written to cover any activity (venipuncture, intubation, etc.), where communicable disease exposure is possible, particularly in departments which provide advanced life support service.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 6: Post-Response

- Upon return to quarters, contaminated equipment will be removed and replaced with clean equipment. Supplies of PPE on response vehicles will be replenished.

- Contaminated equipment will be stored only in the decontamination area. Cleaning an decontamination will be performed as soon as practical.

- Disposable equipment and other biohazard waste generated during on-scene operations will be stored in the biohazard disposal area in appropriate leakproof containers. Sharp! containers, when full, will be closed and placed in the biohazard disposal area.

- Gloves will be worn for all contact with contaminated equipment or materials. Other PPE will be used depending on splash or spill potential. Heavy-duty utility gloves may be used for cleaning, disinfection, or decontamination of equipment.

- Eating, drinking, smoking, handling contact lenses, or applying cosmetics or lip balm is prohibited during cleaning or decontamination procedures.

- Disinfection will be performed with a department-approved disinfectant or with a 1:100 solution of bleach in water. All disinfectants will be tuberculocidal and EPA approved ant registered.

- Any damaged equipment will be cleaned and disinfected before being sent out for repair.

- The manufacturer's guidelines will be used for the cleaning and decontamination of all equipment. Unless otherwise specified:

  - Durable equipment (backboards, splints, MAST pants) will be washed with hot soapy water rinsed with clean water, and disinfected with an approved disinfectant or 1:100 bleach solution. Equipment will be allowed to air dry.

  - Delicate equipment (radios, cardiac monitors, etc.) will be wiped clean of any debris using hot soapy water, wiped with clean water, then wiped with disinfectant or 1:100 bleach solution Equipment will be allowed to air dry.

- Work surfaces will be decontaminated with an appropriate disinfectant after completion of procedures, and after spillage or contamination with blood or potentially infectious materials Seats on response vehicles contaminated with body fluids from soiled PPE also will be disinfected upon return to station.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 6: Post-Response (cont'd)

- Contaminated structural firefighting gear (turnout coats/bunker pants) will be cleaned according to manufacturer's recommendations found on attached labels. Normally, this will consist of a wash with hot soapy water followed by a rinse with clean water. Turnout gear will be air-dried. **Chlorine bleach may impair the fire-retardant properties of structural firefighting gear and will not be used.**

- Contaminated boots will be brush-scrubbed with a hot solution of soapy water, rinsed with clean water, and allowed to air dry.

- Contaminated work clothes (jump suits, t-shirts, uniform pants) will be removed and exchanged for clean clothes. The member will shower if body fluids were in contact with skin under work clothes.

- Contaminated work clothes will be laundered at the station using hot water. **Under no circumstances will contaminated work clothes be laundered at home by any member.**

- Infectious wastes generated during cleaning and decontamination operations will be properly bagged and placed in the biohazard disposal area.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 7: Post-Exposure Protocols

- Any member exposed to potentially infectious material will immediately wash the exposed area with soap and water or saline eye wash if the eyes are involved.

- Any member having an occupational communicable disease exposure will Immediately report the exposure to his or her supervisor. Needlestick injuries will be reported to the infection control officer immediately.

- The member will fill out a communicable disease exposure report before completion of shift for any of the following exposures:

  - Needlestick injury.

  - Break in skin caused by a potentially contaminated object.

  - Splash of blood or other potentially infectious material onto eyes, mucous membranes, o non-intact skin.

  - Mouth-to-mouth resuscitation without pocket mask/one-way valve.

  - Other exposure that the member may feel is significant.

- The report will include details of the task being performed, the means of transmission, the portal of entry, and the type of PPE in use at the time.

- The supervisor will review the communicable disease exposure report and forward it to the Infection Control Officer.

- The Infection Control Officer will evaluate the report for exposure hazards. If a possible exposure occurred, medical evaluation by the Department Physician or designee will be arranged by the Infection Control Officer no later than 48 hours post-exposure. If no exposure took place, the Infection Control Officer will counsel the member on exposure hazards. The Infection Control Officer will complete the communicable disease exposure report, indicating disposition of medical management, and file the report in the office of the Department Physician.

- The Infection Control Officer will perform or refer members for infection control retraining or for stress management counseling if indicated. Spousal counseling will be available.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 7: Post-Exposure Protocols (cont'd)

- The source patient will be traced to the receiving medical facility by the Infection Control Officer. The Infection Control Officer will notify the receiving facility that a communicable disease exposure took place, and request an infectious disease determination, as provided under the Ryan White Act of 1990. Request for consent to test the source patient for HIV and HBV will be made. The source patient has the right to refuse such testing under present regulations.

- The Department Physician or designee will provide appropriate diagnostic workup and treatment of members with communicable disease exposures. Services will include long-term follow-up and member/spousal counseling.

- Under the Ryan White Act, medical treatment facilities will notify the Department Infection Control Officer of any patient transported by members of the department with a diagnosis of an airborne transmissible disease. When so notified, the Infection Control Officer will contact members involved and schedule medical evaluation with the Department Physician.

- Although not required by the Ryan White Act, medical treatment facilities will provide similar notification of diagnosis of bloodborne or other potentially communicable disease if a member provided care or transportation to the source patient, and if disease transmission could have taken place. This policy will be carried out through cooperative agreements between medical treatment facilities and this department. Patient confidentiality will be preserved in any notification procedure.

- The Safety Officer will assume the duties of the Infection Control Officer in his/her absence.

Note: Specific post-exposure protocols have not been included in this example SOP due to the periodic revisions required due to changing medical knowledge.

EXAMPLE (cont'd)

INFECTION CONTROL STANDARD OPERATING PROCEDURES

SOP # IC 6: Compliance and Quality Monitoring Program Evaluation

- Compliance and quality monitoring.

  - The Infection Control Officer will collect compliance and quality monitoring data including:

    Inspections of station facilities.

    Observation of on-scene activities.

    Analysis of reported exposures to communicable diseases.

  - A monthly quality and compliance report will be made by the Infection Control Officer to the Safety/Infection Control Committee.

- Program evaluation.

  - The Infection Control Program will be reevaluated at least annually by the Safety/infection Control Committee to ensure that the program is both appropriate and effective.

  - In addition, the Infection Control Program will be reevaluated as needed to reflect any significant changes in assigned tasks or procedures; in medical knowledge related to infection control; or in regulatory matters.

  - The Department Physician and Department Attorney will actively participate in program reevaluations to ensure that the program remains state of the art.

SECTION III

MANAGING FOR RESULTS

CHAPTER 5

COMPLIANCE AND QUALITY MONITORING

COMPLIANCE AND QUALITY MONITORING

Once the infection control program is formally implemented, mechanisms must be in place for monitoring employee compliance with established standards for patient care and member safety. This chapter explains the concept of compliance/quality monitoring-what's involved, why it's needed, and how to do it.

DEFINITION AND PURPOSE

Compliance and quality monitoring are essential components of an effective infection control program. The monitoring process should begin as soon as the program is initiated and should continue at regular intervals as long as the program exists.

Compliance is making sure that all personnel are following prescribed infection control practices and procedures. Quality monitoring is assuring that all patients receive timely and proper treatment.

PURPOSE

The monitoring process accomplishes several purposes:

- Verifies that the program is "on track" (an adequate level of safety is being maintained).
- Verifies that the members are "on track" (doing what is expected).
- Demonstrates public service accountability (the organization is committed 'to providing quality emergency care to all patients).
- Ensures compliance with applicable laws, standards, and guidelines.
- Protects the organization (and individual members) from potential liability.
- Serves as an ongoing problem identification/problem solving process.

RATIONALE

As emphasized throughout this *Guide,* infection control is a complex issue. Opportunities for the spread of infection abound in the emergency response environment.

- An emergency responder may acquire an infection from a patient.
- A patient may acquire an infection from an emergency responder.
- A patient may acquire an infection from another patient through improperly cleaned equipment.
- An emergency responder may acquire an infection during nonemergency activities, e.g., improper food handling/preparation/storage, improper cleaning/decontamination procedures, etc.

Constant vigilance is required in order to assure continued compliance in all areas of the emergency service work environment.

COMPLIANCE REQUIREMENTS

Compliance/Quality monitoring is a program requirement under published national guidelines.

- CDC *Guidelines* (1987), specifically address the need for compliance monitoring. "When noncompliance is noted, the employee should receive counseling, education, and/or training. If this is not effective, appropriate disciplinary action should be considered."
- OSHA AND CDC, in a *Joint Advisory Notice* (October 19, 1987), recommended "observed routine surveillance of workplace compliance with work practices and use of protective clothing/equipment." This document also states that "noncompliance" which is noted should be clearly documented and the corrective actions listed.

Because of the widely recognized need for compliance monitoring, failure to do so may well become the basis of a lawsuit and/or workers'

compensation claim, and possibly extensive fines.

METHODOLOGY

Compliance and quality monitoring can be achieved in various ways. The most efficient and effective method is on-scene and in-station observation of work practices. (See the exhibits for examples of audit checklists.)

Compliance/Quality data may also be obtained by analysis of inventory reports, incident reports, maintenance reports, and risk management reports. Selection and comparison of data from several sources may serve to validate/confirm identified problems. Since observed noncompliance requires well-documented follow-up, the more verification the better.

DATA ANALYSIS

Collected data is usually consolidated into a formal written report on a monthly basis. This report should be reviewed by the infection control liaison and the Infection Control Advisory Committee.

The data analysis process should focus on: (1) determining the cause(s) of noncompliance; and (2) deciding what actions need to be taken.

FOLLOW-UP OPTIONS

If noncompliance is due to unclear and/or inadequate SOPs, revisions will be required. Noncompliance on the part of one or more individuals may require supervisory intervention (counseling, training, and possibly formal disciplinary action). Noncompliance by larger numbers of responders may indicate a need for reviewing the department's training program or even the organizational culture affecting member attitudes.

The department's physician or medical director may have to be directly involved if the quality of patient care is an issue or if the problem involves confidential health information.

If community biases or practices are the problem, some form of public education may be indicated.

In short, appropriate follow-up activities depend on a thorough analysis of the program and related problems. This is accomplished by objectively gathering and reviewing data that clarify how well the program is being implemented.

SUMMARY

Compliance and quality monitoring assures the day-to-day effectiveness of the infection control program. The emphasis is on identifying problems which are potentially harmful to patients and/or emergency responders and determining effective solutions to identified problems: More detail on gathering and analyzing data for compliance and quality monitoring is included in the chapter on "Information Management."

CHAPTER 6

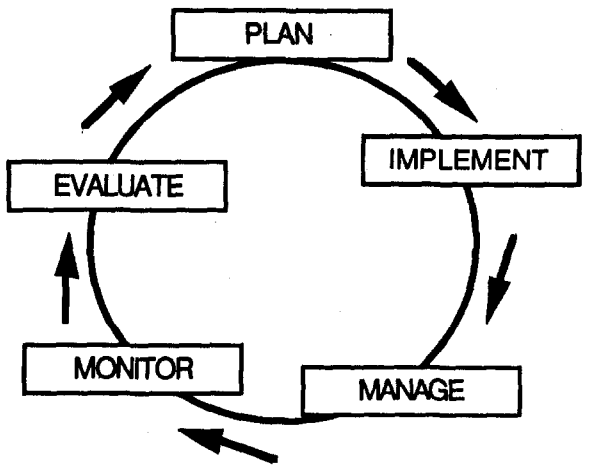
PROGRAM EVALUATION

PROGRAM EVALUATION

This chapter discusses program evaluation, the final component of the infection control program development process. It provides an overview of the evaluation phase--what's involved, why it's needed, and how it can best be accomplished.

OVERVIEW

Any program development process is incomplete without a formal evaluation component. Program development is best described as a cyclical process:



Thus, although evaluation is the "final" step, it actually leads to a new beginning--a repetition of the development cycle--rather than a termination! The following section will clarify this concept.

DEFINITION AND PURPOSE

Evaluation is a systematic analysis of program activities and results for the purpose of determining the overall effectiveness of the program. Unfortunately, many managers mistakenly believe that compliance/quality monitoring is the same as evaluation. However, there are critical differences which must be understood.

As discussed in the previous chapter, the purpose of compliance/quality monitoring is to determine whether or not individuals in the organization are complying with established protocols. Are they doing what's expected and are they doing it correctly? While these are appropriate and important management concerns, it is necessary to ask more questions to determine overall program effectiveness.

While compliance/quality monitoring focuses on "Are we doing things right?," program evaluation is concerned with "Are we doing the right thing?" Thus, the evaluation phase consists of stepping back and reaching an objective determination on: (1) whether or not the infection control program is accomplishing what was originally anticipated; and (2) what needs to be done in order to improve program effectiveness. In effect, this leads to a redesign of the program, which leads you back to the planning component. Thus, the program development cycle begins again!

THE EVALUATION PROCESS

Program evaluation relies on a systematic analysis of various types of data collected over a predetermined period of time. The first formal evaluation might take place six months to one year after program implementation. The focus is on identifying measurable changes which have occurred as a result of the program.

MEASURING RESULTS

In very simple terms, the evaluation phase focuses on measuring the difference between what was happening before the program began and what is happening now. If all evaluation criteria/objectives are stated in measurable terms, actual results can be compared to expected results. Example: One of the infection control program objectives is to have 100% participation in the hepatitis B vaccination program. If five percent of employees were participating before the program was initiated and 78% are participating now, progress in infection control can be assumed.

EVALUATION CRITERIA

Evaluation criteria--in the form of a number of specific measurable objectives--should have been defined clearly during the planning and

development phase (see Chapter 4). Once established, they become the benchmarks by which progress is measured. In other words, they are objective indicators of whether or not progress toward the goal (infection control) is taking place.

Evaluation criteria (objectives) usually focus on measuring improvements in one or more of the following areas:

- Employee attitudes/commitment to infection control requirements.
- Employee knowledge of communicable disease/infection control.
- Compliance with Infection control work practices.
- Employee medical statistics (exposures, compensation claims, sick leave usage, on-the-job injuries, immunization rate, etc.).
- Program administrative accomplishments (training deliveries, improved facilities, procurement of PPE, systems enhancements, etc.).

In addition to department trends, data can also be compared with accepted standards and practices, when known. This approach is particularly important when technologies on regulatory requirements change. Finally, program cost/benefit analyses can help clarify tradeoffs with other department programs and resource needs.

METHODOLOGIES

Listed below are some of the most common techniques for data collection/ analysis used during the evaluation phase.

- Personal interviews.
- Self-assessment instruments.
- Employee surveys or questionnaires.
- Review of various department forms (run sheets, exposure records, compliance/quality monitoring audits, performance appraisals, compensation claims, etc.).

The method(s) you select obviously will depend on the evaluation criteria being measured. Personal interviews, employee surveys, and self-assessment instruments can provide useful information on employee attitudes about infection control and/or employee commitment to the program. Measuring behavioral changes (i.e., improved infection control work practices) will require statistical analysis of appropriate department forms. More detail on techniques for collecting and analyzing related data is included in the chapter entitled “Information Management.”

SUMMARY

Any formal program within an organization must be regularly evaluated and refined in order to ensure its continuing effectiveness. This is especially important when dealing with infection control principles and practices which are constantly being updated. Thus, periodic evaluations will ensure continued compliance with current standards and practices. Also, since the infection control program deals with medical and legal issues and member safety, the department should seek a legal review of all program changes prior to implementation.

CHAPTER 7

INFORMATION MANAGEMENT

INFORMATION MANAGEMENT

This chapter discusses the need to have an organized system for managing the information generated within the infection control program. It describes the purposes of data collection, the types of data systems available, and the specific types of records which should be maintained. The importance of maintaining confidentiality of specific records is also discussed.

PURPOSE AND USE OF DATA

Infection control information management is the process of identifying, gathering, organizing, storing, analyzing, and auditing the data generated within the program. This information must be maintained in a format that is readily retrievable for study and analysis.

One of the most important functions of data collection is to facilitate compliance/quality monitoring. As discussed in Chapter 2, local, state, and federal agencies all have specific requirements and/or guidelines which must be included in the infection control program. Since specific requirements vary according to the jurisdiction, each department will have *to* develop individual forms and checklists to record the required data. The data can then be retrieved and analyzed at regular intervals to monitor compliance with established protocols and to provide documentation for compliance with applicable regulations.

Data collection also plays a critical role in program evaluation. Baseline data collected at the initiation of the program can be compared to later data collected at established intervals, thus providing a clear picture of the rate of progress in reaching stated objectives. The data can also be used to identify training needs when areas of deficiency and/or injury/illness trends are identified.

Finally, data collection permits effective program management on a day-today basis by facilitating various administrative requirements. These include equipment/supplies inventory management, expenditure monitoring, maintenance of employee records, incident analysis, establishing training schedules, etc.

DATA SYSTEMS

Data systems vary from a simple paperbased system to a complex multicomputer systems. Records are defined as any item, collection, or grouping of information regardless of the form or process by which it is maintained (e.g., paper document, microfiche, microfilm, or computer readable files).

Automated data processing provides a more advanced and flexible system. Often, a paper-based system is used to record, for example, medical, training, inventory, exposures, and claims data. This information is then transferred to a computerized database which permits immediate retrieval and analysis of information when required.

Any computerized system must be carefully designed. Analysis of desired information and development of appropriate forms are critical. Stored information should be grouped into specific fields to facilitate easy retrieval and analysis of data.

TYPES OF INFECTION CONTROL DATA TO MAINTAIN

As stated previously, the specific types of data maintained will vary from jurisdiction to jurisdiction, depending on applicable laws and standards and unique organizational needs. The following sections outline the most common types of infection control data maintained by emergency response services.

TRAINING

Infection control training (initial and refresher) is necessary to ensure the protection of each emergency responder. (See Chapter 4 for a discussion of training requirements.) Documentation of training reduces potential departmental liability and may be a legal requirement. Training records should document:

- The date(s) of the training session.
- The subjects covered.

- The name(s) and qualifications of instructor(s).
- The names and titles of all individuals attending.
- Duration of training.
- Test scores or other indications of satisfactory performance.

it is helpful if the information system can be used to compare training records with established training requirements. In this way, individual training needs can be identified, and organizational trends and priorities can be analyzed. OSHA requires that training records on infection control be maintained for three years from the date on which the training

EXPOSURES

All exposures to communicable disease must be documented. Exposure documentation ensures compliance with jurisdictional regulations and protection of members and their families. It can also be used to identify trends which may indicate new training requirements and/or possible modification of existing protocols.

Exposure records should include:

- Date of incident.
- Location of incident.
- Incident number.
- Route of exposure.
- Personnel protective equipment used.
- Type of exposure (disease), if known.
- Member's name.
- Description of member's duties as they relate to this exposure.
- Social security number (required by OSHA).
- Description of incident and circumstances under which the exposure occurred.
- Notifications made.
- Treatment and follow-up provided.

It is important to remember that all exposure records are confidential. Thus, in computerized systems it will be necessary to establish passwords to prohibit unauthorized access to the records. Analytical report formats should not include individual's names or other identifying information unless necessary. Similarly, information from the system should not be distributed to persons without a need to know.

OSHA requires retention of exposure records for the duration of employment plus thirty years. This may require transfer of the records to a separate system. Microfilm may be used. It should also be considered that the existing programs being used will be outdated in thirty years, and thus may not be retrievable.

PERSONNEL HEALTH DATA

The department must establish and maintain an accurate personal medical health record for each member. The medical health record should be an up-to-date and include:

- Name of the member.
- Results of all medical examinations (pre-entry, preassignment, annual/ongoing assessment and post-exposure).
- Medical diagnoses and recommendations.
- Treatment and prescriptions.
- Immunization record, including hepatitis B.
- Follow-up procedures and post-exposure evaluations.
- Member medical complaints and symptoms.
- Record of medically caused work restrictions.

Like exposure records, medical records are confidential and can only be released with the written consent of the member. These should not be kept with other personnel records. OSHA requires medical record retention for the duration of employment plus thirty years.

COMPLIANCE/QUALITY MONITORING

The department must record data on work practices at the scene and in the station to be able to evaluate whether an adequate level

safety is being maintained. In addition, collection of this data will fulfill applicable legal compliance and quality monitoring requirements. Regular observation of employee behavior at emergency incidents and in the station is necessary to evaluate compliance with established protocols and work practices.

Areas which require monitoring include:

- Compliance with infection control protocols (for example, appropriate use of PPE to ensure body substance isolation).
- Storage facilities (conspicuously marked and secured).
- Disinfecting areas (marked, contaminants isolated).
- Disposal areas (marked, containers secured, waste disposal logs up-to-date).
- Compliance with applicable laws/ regulations.

Compliance monitoring can be easily accomplished by developing specific audit forms based on jurisdictional requirements. Audit results should be documented and maintained. All deficiencies noted should include recommendations for improvement and follow-up reinspections.

EQUIPMENT AND SUPPLIES INVENTORY

One of the key elements of an effective infection control program is the availability of all required equipment and supplies. This can only be accomplished through an accurate and efficient inventory system. An inventory listing must be developed itemizing all items necessary to support the program.

For each item, the inventory should document:

- Cost of item.
- Minimum on-hand requirement.
- Expiration date.
- Current stock balance.
- Date/amount ordered.
- Date received.
- Date/amount issued.
- Organization/individual receiving the supplies.

ADDITIONAL DATA SOURCES

Employee interviews can be utilized to determine an individual's knowledge, understanding, and acceptance of the infection control program. Such interviews, combined with incident scene and/or station observations, can be used to determine the overall effectiveness of the program.

Post-incident critiques or individual debriefing of members after an emergency medical response allows the supervisor to identify areas of confusion or uncertainty which can be addressed in counseling and/or training sessions.

Incident run sheets can be utilized to identify unexpected trends within the system. For example, increases in response will require increased use of supplies and equipment. This will obviously affect inventory supply and necessitate reordering of supplies. It may also require increases in future budget requests.

Compensation claims can be monitored to identify trends in injuries and exposures. An effective infection control program should result in a reduced number of claims. Thorough analysis of types and quantity of claims provides valuable insight on possible training requirements, behavior modification needs, and/or desired protocol changes.

Finally, it is useful to monitor community health trends to keep abreast of prevalent communicable diseases, potentially dangerous situations, etc. This approach facilitates a proactive infection control response to unexpected threats. For example, if there is an outbreak of measles within the community, the department could take immediate early action to notify all members, verify previous immunization, and implement more stringent infection control procedures.

CONFIDENTIALITY AND RELATED ISSUES

Maintaining the confidentiality of certain records is necessary for the protection of both employees and patients. Each individual's right to privacy is guaranteed by law and each state/ municipality has enacted "privacy laws" which regulate information release and record retention.

PATIENT INFORMATION

All patient-related information is confidential. Each department should have standard operating procedures covering the release of patient information, since inadvertent release of confidential information can result in civil liability. Patient information should only be released to authorized individuals with the consent of the patient.

All inquiries and the release of patient information should be documented and stored. The records should include a copy of the authorization for release, the name of the individual receiving the information, the name of the individual releasing the information, and the dates involved.

MEMBER RECORDS

Members' medical records are also confidential. While exposure records may be used to evaluate the effectiveness of the program, the confidentiality of the members involved must be maintained. The types and numbers of exposures can be audited but names must not be used. A system must be designed to protect the confidentiality of individuals' medical information.

Written procedures should specify who has access to medical records and under what conditions. The process by which medical information is collected, stored, retrieved, and released must be carefully thought out. Release of medical information should only occur with the written consent of the member. The consent form should include:

- Date of written authorization.
- Name and signature of member authorizing release of information.
- Name of individual authorized to receive medical information.
- Description of medical information to be released.
- General description of the purpose for release of the medical information.
- Date upon which the written authorization expires.

It is critical that members' medical records are not disclosed or reported to any person within or outside the department except as required by law.

The original medical records should stay in the department medical file. Only copies of this information should be released with proper authorization.

COMPUTER SECURITY

As stated previously, computerized systems must include carefully designed procedures to protect the confidentiality of patient and member medical records. This may require the use of passwords to limit access to a minimum of individuals.

Logs should be maintained to document the release of information. Access to the computer or computer terminals must be secured. (This also applies to written records in a filing system.) Only authorized personnel should have access to the password or secure areas that contain medical records. The issuance of authorization, keys, etc., shall be recorded and monitored.

ADDITIONAL GUIDANCE

The department should take full advantage of legal resources available for guidance on statutory requirements. Any local health facility may be able to provide information on how to secure medical records. They may also provide general information on data management that can be modified for the department program,

SUMMARY

Infection control data collection and analysis is critical for effective compliance/quality

monitoring, program evaluation, and ongoing program management. Detailed records must be maintained in the areas of training, exposure incidents, health, work practices, and equipment/supplies inventories. The confidentiality of patient-related information and members' medical/exposure records must be assured.

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APPENDICES SECTION

A. Glossary of Common Terms

B. Laws, Standards, and Guidelines

C. Sources of Additional Information

APPENDIX A

GLOSSARY OF COMMON TERMS

The following Is a list of terms commonly used in infection control and/or prehospital emergency care systems. Where a specific definition is quoted, the source is indicated in parentheses.

GLOSSARY OF COMMON TERMS

AIDS Acquired Immune Deficiency Syndrome, a communicable disease caused by Human Immunodeficiency Virus (HIV).

ADVANCED LIFE SUPPORT (ALS) Emergency medical treatment at an advanced level, usually provided by paramedics, and including use of drugs, cardiac monitoring/intervention, and intravenous fluids.

AIRBORNE PATHOGEN Pathologic microorganisms spread by droplets expelled into the air, typically through a productive cough or sneeze.

ANTIBODY A component of the immune system which eliminates or counteracts a foreign substance (Antigen) in the body.

ANTIGEN A foreign substance which stimulates the production of antibodies in the immune system.

ARC (AIDS Related Complex) An outdated term used to describe symptoms of HIV infection in patients who have not developed AIDS. These include fatigue, diarrhea, night sweats, and enlarged lymph nodes. ARC is not included in the current Centers for Disease Control classification of HIV infection.

BACTERIA A type of living microorganism that can produce disease in a suitable host. Bacteria can self-reproduce, and some forms may produce toxins harmful to their host.

BASIC LIFE SUPPORT (BLS) "Emergency medical treatment at a level authorized to be performed by emergency medical technicians as defined by the medical authority having jurisdiction." (NFPA 1500.) Generally refers to treatment provided at EMT-A level.

BLOODBORNE PATHOGEN Pathologic microorganisms that are present in human blood and that can cause disease in humans. (OSHA.) Note: the term "blood" includes blood, blood components, and products made from human blood.

BODY FLUIDS "Fluids that have been recognized by the CDC as directly linked to the transmission of HIV and/or HBV and/or to which Universal Precautions apply: blood, semen, blood products, vaginal secretions, cerebrospinal fluid, synovial fluid, pericardial fluid, amniotic fluid, and concentrated HIV or HBV viruses." (OSHA.)

BODY SUBSTANCE ISOLATION (BSI) An infection control strategy which considers all body substances potentially infectious. (See Universal Precautions.)

CDC--CENTERS FOR DISEASE CONTROL A branch of the Public Health Service, Department of Health and Human Services concerned with communicable disease tracking and control.

CHICKENPOX highly communicable disease caused by a herpes virus.
Commonly occurs in childhood.

CISD--CRITICAL INCIDENT STRESS DEBRIEFING Stress reduction processes designed to address the special needs of emergency response personnel in dealing with situations which cause strong emotional reactions or interfere with the ability to function.

CLEANING The physical removal of dirt and debris.

COMMUNICABLE DISEASE A disease that can be transmitted from one person to another. Also known as contagious disease.

CONTAMINANT/CONTAMINATED "A substance or process that poses a threat to life, health, or the environment." (NFPA 472.)

DEBILITATING ILLNESS OR INJURY "A condition that temporarily or permanently prevents a member of the fire department from engaging in normal duties and activities as a result of illness or injury." (NFPA 1500.)

DECONTAMINATION "The physical and/or chemical process of reducing and preventing the spread of contamination from persons and equipment." (NFPA 472.)

DIRECT DISEASE TRANSMISSION When a communicable disease is transmitted from one person to another due to direct contact with infected blood, body fluids, or other infectious materials.

DISEASE An alteration of health, with a characteristic set of symptoms, which may affect the entire body or specific organs. Diseases have a variety of causes and are known as infectious diseases when due to a pathogenic microorganism such as a bacteria, virus, or fungus.

DISINFECTION "A procedure which inactivates virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (ex. bacterial endospores) on inanimate objects." (OSHA.)

ELISA Enzyme-linked immunosorbent assay, a test used to detect antibodies to the AIDS virus, indicating infection. For accuracy, a positive ELISA test is always repeated. If still positive, a western blot test is then performed to confirm the diagnosis. The sensitivity and specificity of a properly performed ELISA test twelve weeks after exposure is at least 99 percent (MMWR, 1987).

EMERGENCY- The provision of treatment to patients, including first aid, cardiopulmonary resuscitation, basic life support (EMT level), advanced life support (Paramedic level), and other medical procedures that occur prior to arrival at a hospital or other health care facility. (NFPA 1581.)

EMERGENCY MEDICAL OPERATIONS Delivery of emergency medical care and transportation prior to arrival at a hospital or other health care facility. (NFPA 1581.)

EMS--EMERGENCY MEDICAL SERVICES A group, department, or agency that is trained and equipped to respond in an organized manner to any emergency situation where there is the potential need for the delivery of pre-hospital emergency medical care and/or transportation. EMS can be provided by fire department, private, third service, or hospital-based systems or any combination thereof.

ENTERIC PRECAUTIONS A system of precautions to prevent transmission of disease by the oral/fecal route.

ETIOLOGIC AGENT A living organism that may cause human disease.

EXPOSURE Eye, mouth, other mucus membrane, nonrelated skin, or parenteral contact with blood, other body fluids, or other potentially infectious material.

FIRE DEPARTMFNT SAFFTY OFFICER "A member of the fire department, assigned and authorized by the fire chief to perform the duties and responsibilities defined in this standard." (NFPA 1501.)

FIRST RESPONDER Personnel who arrive first on the scene at emergency incidents and have the responsibility to act. Includes fire, police, EMS, and other public safety workers.

FLUID RESISTANT CLOTHING Clothing designed and constructed to provide a barrier against accidental contact with body fluids.

FUNGUS A group of microorganisms including molds and yeasts, similar to the cellular structure of plants. Some fungi are pathogenic (can cause disease).

GERMAN MEASLES See Rubella.

GLOVES, FIREFIGHTING Gloves that meet the OSHA requirements for firefighting (29 CFR Part 1910.156) or NFPA standards (1973, Gloves for Structural Firefighters).

GONORRHEA A sexually transmitted disease caused by the bacteria Neisseria gonorrhea.

HBV Abbreviation for hepatitis B virus.

HCV Abbreviation for hepatitis C virus.

HEALTH HAZARD "Any property of a material that either directly or indirectly can cause injury or incapacitation, either temporary or permanent, from exposure by contact, inhalation, or ingestion." (NFPA 1501.)

HEALTH CARE WORKER "An employee of a health care facility including, but not limited to, nurses, physicians, dentists, and other dental workers, optometrists, podiatrists, chiropractors, laboratory and blood bank technologists and technicians, research laboratory scientists, phlebotomists, dialysis personnel, paramedics, emergency medical technicians, medical examiners, morticians, housekeepers, laundry workers, and others whose work may Involve direct contact with body fluids as defined below, from living individuals or corpses." (OSHA, bold added.) Note: This definition includes firefighters, due to potential for direct contact with body fluids during firefighting, rescue, extrication, and other emergency response activities.

HEALTH DATABASE "A compilation of records and data relating to the health experience of a group of individuals, maintained in a manner such that it is retrievable for study and analysis over a period of time." (NFPA 1500.)

HEALTH PROMOTION "Preventive health activities that identify real and potential risks in the workplace, and that inform, motivate, and otherwise help people to adopt and maintain healthy practices and lifestyles." (NFPA 1500.)

HEPATITIS Inflammation or swelling of the liver. Hepatitis can be caused by certain drugs, toxins, or infectious agents, including viruses. Hepatitis caused by viruses include hepatitis A, B, and D (Delta), and non-A, non-B. Non-A non-B hepatitis includes hepatitis C, hepatitis E, and other, as yet unclassified, types of hepatitis.

HEPATITIS A ("Infectious Hepatitis") A viral form of hepatitis normally spread by fecal contamination and generally not a significant risk for emergency care providers.

HEPATITIS B (HRV) ("Serum Hepatitis") A viral form of hepatitis spread through blood contact, and also as a sexually transmitted disease. Hepatitis B is a significant risk for emergency care workers. Infection may result in death, chronic hepatitis, liver cancer, or cirrhosis of the liver. A vaccine to prevent spread of hepatitis B is available.

HEPATITIS C (HCV) A recently identified viral form of hepatitis, spread via blood contact.

HEPATITIS D (DELTA. HDV) A viral infection occurring in people with present or past HBV infection. Delta hepatitis is a complication of HBV infection and can increase the severity of HBV infection.

HEPATITIS. NON-A NON-B (NANB) Viral hepatitis caused by a virus other than hepatitis A or B. A disease of exclusion, there are probably several viruses responsible. NANB hepatitis is a bloodborne infection, and the cause of ninety percent of post-transfusion hepatitis cases.

HERPES A family of similar viruses, which can cause different diseases, including chickenpox, zoster, "cold sores," and genital herpes type II.

HERPES ZOSTER A painful skin rash caused by recurrence of a past case of chickenpox.
is not typically spread person-to-person; however, persons who have not had chickenpox previously can contract chickenpox after exposure to a patient with zoster.

HIV Abbreviation for Human lmmunodeficiency Virus.

HIV INFECTlON (HlV positive) A person who has tested positive for HIV antibodies on two ELISA tests, confirmed with western blot testing. HIV infected patients may or may not develop AIDS, but can spread the virus through blood and bodily fluids.

HOST A person that can harbor or nourish a disease-producing organism. The host is infected. (See also: carrier.)

HTLV Human T-cell Lymphotropic Virus, the former name for the AIDS virus. Now called Human lmmunodeficiency Virus or HIV.

HUMAN IMMUNODEFICIENCY VlRUS The causative agent of AIDS. HIV type 1
cases of AIDS. A second virus, HIV-2 is a less common cause of the disease.

IATROGENIC Caused by the doctor," a complication, injury, or disease state resulting from medical treatment.

IMMINENT HAZARD "An act or condition that is judged to present a danger to persons or property that is so urgent and severe that it requires immediate corrective or preventive action." (NFPA 1500.)

IMMUNIZATION The process of rendering a person immune, or highly resistant to a disease.

INCIDENT COMMAND SYSTEM See Incident Management System.

INCIDEMT COMMANDER The person responsible for the overall coordination and direction of all activities at the incident scene, as specified in NFPA 1561, "Standard on Fire Department Incident Management System."

INCIDENT MANAGEMENT SYSTEM An organized system of roles, responsibilities, and standard operating procedures used to manage emergency operations, as described in NFPA 1561, "Standard on Fire Department Incident Management System." Such systems are often referred to as "Incident Command Systems."

INCUBATION PERIOD The time from exposure to the disease until the first appearance of symptoms.

INDIRECT DISEASE TRANSMISSION When a communicable disease is transmitted from one person to another without direct contact.

INFECTION Growth of pathogenic organisms in the tissues of a host, with or without detectable signs of injury.

INFECTION CONTROL OFFICER A member of a department assigned specific responsibility for department infection control practices, including immunizations and post-exposure follow-up protocols. This officer fulfills the responsibilities for "designated officer" listed in the Ryan White Act.

INFECTION CONTROL PRACTITIONER A medical professional with a specialty interest in infection control.

INFECTION CONTROL PROGRAM "The establishment's oral or written policy and implementation of procedures relating to the control of infectious disease hazards where employees may be exposed to direct contact with body fluids." (OSHA.)

INFECTIOUS WASTE "Blood and blood products, pathological wastes, microbiological wastes, and contaminated sharps." (MMWR.)

INFECTIOUS DISEASE An illness or disease resulting from invasion of a host by disease-producing organisms such as bacteria, viruses, fungi, or parasites,

INFECTIOUS Capable of causing infection in a suitable host.

JOINT ADVISORY NOTICE A list of recommendations developed to assist employers in implementing the Centers for Disease Control guidelines. (Dept. of Labor/Dept. of Health & Human Services Joint Advisory Notice, Oct. 19, 1987.)

LAV Lymphadenopathy Associated Virus, an early name for the virus that causes AIDS. Now called Human lmmunodeficiency Virus, HIV.

LEAKPROOF BAG A bag designed for disposal of potentially infectious substances, color coded, and labeled in accordance with applicable laws.

MEASLES A vaccine-preventable viral communicable disease causing a skin rash. Usually occurs in childhood.

MEMBER "A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization. For the purposes of this standard (1500), a fire department member may be a full-time or part-time employee, a paid or unpaid volunteer, may occupy any position or rank within the fire department, and may or may not engage in emergency operations." (NFPA 1500.) Note: also applies to emergency medical services and law enforcement.

MEMBER ASSISTANCE PROGRAM "A generic term used to describe the various methods used in the workplace for the control of alcohol and other substance abuse, stress, and personal problems that adversely affect job performance." (NFPA 1500.)

MENINGITIS An infection of the meninges, the covering layers of the brain and spinal cord. May be caused by a bacteria or virus; considered a communicable disease.

MICROORGANISM A living organism, usually visible only with a microscope, including bacteria, viruses, parasites, and fungi.

MUCOUS The lining of the nose, mouth, eyes, vagina, and rectum. Mucous membranes are not as durable as other skin; contact of infected body fluids with intact mucous membranes may transmit disease.

MUMPS A vaccine-preventable communicable disease caused by a virus, usually occurring in children. May cause serious complications in adult cases.

MMWR--MORBIDITY AND MORTALITY WEEKLY REPORT A weekly publication from the Centers for Disease Control presenting up-to-date information on communicable diseases.

NEEDLES STICK A parenteral exposure with a needle contaminated from patient use.

NOSOCOMIAL "Originating in the hospital." A disease spread by contact with the health-care system.

OCCUPATIONAL EXPOSURE "Reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties." (OSHA.) This definition excludes incidental exposures that may take place on the job, that are neither reasonably or routinely expected and that the worker is not required to incur in the normal course of employment.,'

OCCUPATIONAL ILLNESS "An illness or disease contracted through or aggravated by the performance of the duties, responsibilities, and functions of a fire department member." (NFPA 1500.)

OCCUPATIONAL INJURY “An injury sustained during the performance of the duties, responsibilities, and functions of a fire department member.,, (NFPA 1500.)

PARENTERAL EXPOSURE “Exposure which occurs through a break in the skin barrier.” (OSHA.) This would include injections, needle sticks, human bites, and cuts contaminated with blood.

PATHOGEN A microorganism that can cause disease. Pathogens can be bacteria, fungi, parasites, or viruses.

PATHOGEN Capable of causing disease.

PHLEBOTOMIST Any health-care worker who draws blood samples. (OSHA.)

PNEUMOCYCTIS PNEUMONIA (PCP) A type of pneumonia caused by a parasite, seen in patients with impaired immune systems.

POLIO. POLIOMYELITIS A vaccine-preventable viral disease uncommonly seen in the United States.

PPD--PURIFIED PROTEIN DERIVATIVE A skin test for exposure to tuberculosis.

PPE--PERSONAL PROTECTIVE EQUIPMENT “Specialized clothing or equipment worn by an employee for protection from a hazard. General work clothes (e.g., uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.” (OSHA.)

PUNCTURE-RESISTANT CONTAlNER A leakproof container designed to safely store and/or transport contaminated sharps for proper disposal.

RECOMBINANT VACCINE A vaccine produced by genetic manipulation (gene splicing), usually in yeast

RESCUE INCIDENT “An emergency incident that primarily involves the rescue of persons subject to physical danger, and may include the provision of emergency medical services.” (NFPA 1500.)

RPR A blood test for syphilis.

RUBELLA A vaccine-preventable viral disease. Rubella infection during pregnancy can cause birth defects.

SAFER SEX PRACTICES Practices designed to reduce risk of sexually transmitted diseases, including use of barrier techniques.

SEXUALLY TRANSMITTED DISEASE (STD) A disease spread through sexual contact or activities. HIV and HBV are both bloodborne and sexually transmitted diseases.

SEROCONVERSION A change in the status of one’s serum test. For example, someone initially tests negative for HIV, then tests positive at a later date.

SHARPS “Any object that can penetrate the skin including, but not limited to needles, lancets, scalpels, and broken capillary tubes.” (OSHA.)

SHINGLES Common term for herpes zoster infection, resulting in painful rash.

STERILIZATION “The use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores.” (OSHA.)

SYPHILIS A sexually transmitted infectious disease. Syphilis is uncommonly transmitted through blood exposure or transfusion.

TUBERCULOCIDAL Capable of killing tuberculosis (TB) bacteria. Used as a guideline for effectiveness of disinfection or sterilization, because TB bacteria are difficult to kill.

TUBERCULOSIS (TB) A communicable disease caused by the bacteria mycobacterium tuberculosis, usually affecting the lungs. The incidence of TB has increased since the advent of aids.

UNIVERSAL PRECAUTIONS "A system of infectious disease control which assumes that every direct contact with body fluids is infectious and requires every employee exposed to direct contact with body fluids to be protected as though such body fluids were HBV or HIV infected. Therefore, Universal Precautions are intended to prevent health-care workers from parenteral, mucous membrane, and nonintact skin exposures to bloodborne pathogens (bold added) and should be used by emergency response personnel." (OSHA.)

Note: Universal Precautions differ from Body Substance Isolation (BSI) in that Universal Precautions pertains only to specific body fluids. BSI pertains to all body fluids.

VACCINE-PREVENTABLE DISEASE A disease for which a vaccine is available to reduce the chances of contracting the disease.

VDRL A blood test for syphilis. (Stands for Veneral Disease Research Laboratory, where the test was designed.)

VENEREAL, Due to or propagated by sexual contact.

VIRULENCE The disease-evoking power of a microorganism in a given host.

VIRUS A microorganism usually only visible with the electron microscope. Viruses normally reside within other living (host) cells, and cannot reproduce outside of a living cell.

WESTERN BLOT A test for HIV, used to confirm a positive ELISA test. More expensive and time consuming to perform than ELISA, but more specific. Diagnosis of HIV infection requires two positive ELISA tests, confirmed with a positive Western blot test.

WHITLOW A fingertip infection commonly caused by herpes virus. Spread by contact with respiratory secretions.

WINDOW PHASE The time from exposure to the disease to positive testing.

APPENDIX B

LAWS, STANDARDS, AND GUIDELINES

1. *Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public-Safety Workers.* (CDC, 1989)

2. *Occupational Exposure to Bloodborne Pathogens; Final Rule.* (OSHA 29 CFR Part 1910.1030.)

   (Note: Only the actual standard is included. Emergency services organizations may also wish to procure a copy of the comprehensive preamble to the final rule, which provides related definitions, explanations, studies, etc.)

3. Ryan White Comprehensive AIDS Resources Emergency Act of 1990, Subtitle B. (PL 101-381)

Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public-Safety Workers

A Response to P.L. l00-607
The Health Omnibus Programs Extension Act of 1988

U.S. Department of Health and Human Services
Public Health Service
Centers for Disease Control
Atlanta, Georgia

February 1989

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I. Introduction

A. Background

This document is a response to recently enacted legislation, Public Law 100-607, The Health Omnibus Programs Extension Act of 1988, Title II, Programs with Respect to Acquired Immune Deficiency Syndrome ("AIDS Amendments of 1988"). Subtitle E, General Provisions, Section 253(a) of Title II specifies that "the Secretary of Health and Human Services, acting through the Director of the Centers for Disease Control, shall develop, issue, and disseminate guidelines to all health workers, public safety workers (including emergency response employees) in the United States concerning-

(1) methods to reduce the risk in the workplace of becoming infected with the etiologic agent for acquired immune deficiency syndrome; and

(2) circumstances under which exposure to such etiologic agent may occur."

It is further noted that "The Secretary [of Health and Human Services] shall transmit the guidelines issued under subsection (a) to the Secretary of Labor for use by the Secretary of Labor in the development of standards to be issued under the Occupational Safety and Health Act of 1970," and that "the Secretary, acting through the Director of the Centers for Disease Control, shall develop a model curriculum for emergency response employees with respect to the prevention of exposure to the etiologic agent for acquired immune deficiency syndrome during the process of responding to emergencies."

Following development of these guidelines and curriculum, "[t]he Secretary shall-

(A) transmit to State public health officers copies of the guidelines and the model curriculum developed under paragraph (1) with the request that such officers disseminate such copies as appropriate throughout the State; and

(B) make such copies available to the public."

B. Purpose and Organization of Document

The purpose of this document is to provide an overview of the modes of transmission of human immunodeficiency virus (HIV) in the workplace, an assessment of the risk of transmission under various assumptions, principles underlying the control of risk, and specific risk-control recommendations for employers and workers. This document also includes information on medical management of persons who have sustained an exposure at the workplace to these viruses (e.g., an emergency medical technicians who incur a needle-stick injury while performing professional duties). These guidelines are intended for use by a technically informed audience. As noted above, a separate model curriculum based on the principles and practices discussed in this document is being developed for use in training workers and will contain less technical wording.

Information concerning the protection of workers against acquisition of the human immunodeficiency virus (HIV) while performing job duties, the virus that causes AIDS, is presented here. Information on hepatitis B virus (HBV) is also presented in this document on the basis of the following assumptions:

- the modes of transmission for hepatitis B virus (HBV) are similar to those of HIV,
- the potential for HBV transmission in the occupational setting is greater than for HIV,
- there is a larger body of experience relating to controlling transmission of HBV in the workplace, and

- general practices to prevent the transmission of HBV will also minimize the risk of transmission of HIV.

Blood-borne transmission of other pathogens not specifically addressed here will be interrupted by adherence to the precautions noted below. It is important to note that the implementalion of control measures for HIV and HBV does not obviate the need for continued adherence to general infection-control principles and general hygiene measures (e.g., hand washing) for preventing transmission of other infectious diseases to both worker and client. General guidelines for control of these diseases have been published *(1,2,3).*

This document was developed primarily to provide guidelines for fire-service personnel, emergency medical technicians, paramedics (see section IV, page 14), and law-enforcement and correctional-facility personnel (see section V, page 16). Throughout the report, paramedics and emergency medical technicians are called "emergency medical workers" and fire-service, law-enforcement, and correctional-facility personnil, "public-safety workers." Previously issued guidelines address the needs of hospital-, laboratory-, and clinic-based health-care workers and are reprinted in Appendix A (see page 31) and Appendix B (see page 36). A condensation of general guidelines for protection of workers from transmission of blood-borne pathogens, derived from the Joint Advisory Notice of the Departments of Labor and Health and Human Services (4), is provided in section III (see page 8).

C. Modes and Risk of Virus Transmission in the Workplace

Although the potential for HBV transmission in the workplace setting is greater than for HIV, the modes of transmission for these two viruses are similar. Both have been transmitted in occupational settings only by percutaneous inoculation or contact with an open wound, nonintact (e.g., chapped, abraded, weeping. or dermatitic) skin, or mucous membranes to blood, blood-contaminated body fluids, or concentrated virus. Blood Is the single most important source of HIV and HBV In the workplace setting. Protection measures against HIV and HBV for workers should focus primarily on preventing these types of exposures to blood as well as on delivery of HBV vaccination.

The risk of hepatitis B infection following a parenteral (i.e., needle slick or cut) exposure to blood is directly proportional to the probability that the blood contains hepatitis B surface antigen (HBsAg), the immunity status of the recipient, and on the efficiency of transmission (5). The probability of the source of the blood being HBsAg positive varies from 1 to 3 per thousand in the general population to 5%-15% in groups at high risk for HBV infection, such as immigrants from areas of high endemicity (China and Southeast Asia, subsaharan Africa, most Pacific islands, and the Amazon Basin); clients in institutions for the mentally retarded; intravenous drug users; homosexually active males; and household (sexual and non-sexual) contacts of HBV carriers. Of persons who have not had prior hepatitis B vaccination or postexposure prophylaxis, 6%-30% of persons who receive a needle-stick exposure from an HBsAg-positive individual will become infected (5).

The risk of infection with HIV following one needle-stick exposure to blood from a patient known to be infected with HIV is approximately 0.5% (6,7). This rate of transmission is considerably lower than that for HBV, probably as a result of the significantly lower concentrations of virus in the blood of HIV-infected persons. Table 1 (see page 24) presents theoretical data concerning the likelihood of infection given repeated needle-stick injuries involving patients whose HIV serostatus is unknown. Though inadequately quantified, the risk from exposure of nonintact skin or mucous membranes is likely to be far less than that from percutaneous inoculation.

D. Transmission of Hepatitis B Virus to Workers

1. Health-care workers

In 1987, the CDC estimated the total number of HBV infections in the United States to be 300,000 per year, with approximately 75,000 (25%) of infected persons developing acute hepatitis. Of these infected individuals, 18,000-30,000 (6%-10%) will become HBV carriers, at risk of developing chronic liver disease (chronic active hepatitis, cirrhosis, and primary liver cancer), and infectious to others.

CDC has estimated that 12,000 health-care workers whose jobs entail exposure to blood become infected with HBV each year, that.500-600 of them are hospitalized as a result of that infection, and that 700-1,200 of those infected become HBV carriers. Of the infected workers, approximately 250 will die (12-15 from fulminant hepatitis, 170-200 from cirrhosis, and 40-50 from liver cancer). Studies indicate that 10%-30% of health-care or dental workers show serologic evidence of past or present HBV infection.

2. Emergency medical and public-safety workers

Emergency medical workers have an increased risk for hepatitis B infection *(8,9,10).* The degree of risk correlates with the frequency and extent of blood exposure during the conduct of work activities. A few studies are available concerning risk of HBV infection for other groups of public-safety workers (law-enforcement personnel and correctional-facility workers), but reports that have been published do not document any increased risk for HBV infection *(11,12,13).* Nevertheless, in occupational settings in which workers may be routinely exposed to blood or other body fluids as described below, an increased risk for occupational acquisition of HBV infection must be assumed to be present.

3. Vaccination for hepatitis B virus

A safe and effective vaccine to prevent hepatitis B has been available since 1982. Vaccination has been recommended for health-care workers regularly exposed to blood and other body fluids potentially contaminated with HBV *(5,14,15).* In 1987, the Department of Health and Human Services and the Department of Labor stated that hepatitis B vaccine should be provided to all such workers at no charge to the worker (4).

Available vaccines stimulate active immunity against HBV infection and provide over 90% protection against hepatitis B for 7 or more years following vaccination (5). Hepatitis B vaccines also are 70-88% effective when given within 1 week after HBV exposure. Hepatitis B immune globulin (HBIG), a preparation of immunoglobulin with high levels of antibody to HBV (anti-HBs), provides temporary passive protection following exposure to HBV. Combination treatment with hepatitis B vaccine and HBIG is over 90% effective in preventing hepatitis B following a documented exposure (5).

E. Transmission of Human Immunodeficiency Virus to Workers

1. Health-care workers with AIDS

As of September 19, 1988, a total of 3,182 (5.1%) of 61,929 adults with AIDS, who had been reported to the CDC national surveillance system and for whom occupational information was available, reported being employed in a health-care setting. Of the health-care workers with AIDS, 95%

reported high-risk behavior; for the remaining 5% (169 workers), the means of HIV acquisition was undetermined

Of these 169 health-care workers with AIDS with undetermined risk, information is incomplete for 28 (17%) because of death.or refusal to be interviewed; 97 (57%) are still being investigated. The remaining 44 (26%) health-care workers were interviewed directly or had other follow-up information available. The occupations of these 44 were nine nursing assistants (20%); eight physicians (18%), four of whom were 'surgeons; eight housekeeping or maintenance workers (18%); six nurses (14%); four clinical laboratory technicians (9%); two respiratory therapists (5%); one dentist (2%); one paramedic (2%); (2%); one embalmer (2%); and four others who did not have contact with patients (9%). Eighteen of these 44 health-care workers reported parentera! and/or other non-needle-stick exposure to blood or other body fluids from patients in-the 10 years preceding their diagnosis of AIDS. None of these exposures involved a patient with AIDS or known HIV infection, and HIV seroconversion of the health-care worker was not documented following a specific exposure.

2. Human immunodeficiency virus transmission in the workplace

As of July 31, 1988, 1,201 health-care workers had been enrolled and tested for HIV antibody in ongoing CDC surveillance of health-care workers exposed via needle stick or splashes to skin or mucous membranes to blood from patients known to be HIV-infected *(16).* Of 860 workers who had received needle-stick injuries or cuts with sharp objects (i.e., parenteral exposures) and whose serum had been tested for HIV antibody at least 180 days after exposure, 4 were positive, yielding a seroprevalence rate of 0.47%. Three of these individuals experienced an acute retroviral syndrome associated with documented seroconversion. Investigation revealed no nonoccupational risk factors for these three workers. Serum collected within 30 days of exposure was not available from the fourth person. This worker had an HIV-seropositive sexual partner, and heterosexual acquisition of infection cannot be excluded. None of the 103 workers who had contamination of mucous membranes or nonintact skin and whose serum had been tested at least 180 days after exposure developed serologic evidence of HIV infection.

Two other ongoing prospective studies assess the risk of nosocomial acquisition of HIV infection among health-care workers in the United States. As of April 1988, the National Institutes of Health had tested 983 health-care workers, 137 with documented needle-stick injuries and 345 health-care workers who had sustained mucous-membrane exposures to blood or other body fluids of HIV-infected patients; none had seroconverted *(17)* (one health-care worker who subsequently experienced an occupational HIV seroconversion has since been reported from NIH *[18]).* As of March 15, 1988, a similar study at the University of California of 212 health-care workers with 625 documented accidental parenteral exposures involving HIV-infected patients had identified one seroconversion following a needle stick *(19).* Prospective studies in the United Kingdom and Canada show no evidence of HIV transmission among 220 health-care workers with parenteral, mucous-membrane, or cutaneous exposures *(20,21).*

In addition to the health-care workers enrolled in these longitudinal surveillance studies, case histories have been published in the scientific literature for 19 HIV-infecred heallh-care workers (13 with documented seroconversion and 6 without documented seroconversion). None of these workers reported nonoccupational risk factors (see Table 2, pages 25. 26).

3. Emergency medical service and public-safety workers

In addition to the one paramedic with undetermined risk discussed above, three public-safety workers (law-enforcement officers) are classified in the undetermined risk group. Follow-up investigations of these workers could not determine conclusively if HIV infection was acquired during the performance of job duties.

II. Principles of Infection Control and Their Application to Emergency and Public-Safety Workers

A. General Infection Control

Within the health-care setting, general infection control procedures have been developed to minimize the risk of patient acquisition of infection from contact with contaminated devices, objects, or surfaces or of transmission of an infectious agent from health-care workers to patients *(1,2,3).* Such procedures also protect workers from the risk of becoming infected. General infection-control procedures are designed to prevent transmission of a wide range of microbiological agents and to provide a wide margin of safety in the varied situations encountered in the health-care environment.

General infection-control principles are applicable to other work environments where workers contact other individuals and where transmission of infectious agents may occur. The modes of transmission noted in the hospital and medical office environment are observed in the work situations of emergency and public-safety workers, as well. Therefore, the principles of infection control developed for hospital and other health-care settings are also applicable to these work situations. Use of general infection control measures, as adapted to the work environments of emergency and public-safety workers, is important to protect both workers and individuals with whom they work from a variety of infectious agents, not just HIV and HBV.

Because emergency arid public-safety workers work in environments that provide inherently unpredictable risks of exposures, general infection-control procedures should be adapted to these work situations. Exposures are unpredictable, and protective measures may often be used in situations that do not appear to present risk. Emergency and public-safety workers perform their duties in the community under extremely variable conditions; thus, control measures that are simple and uniform across all situations have the greatest likelihood of worker compliance. Administrative procedures to ensure compliance also can be more readily developed than when procedures are complex and highly variable.

B. Universal Blood and Body Fluid Precautions to Prevent Occupational HIV and HBV Transmission

In 1985, CDC developed the strategy of "universal blood and body fluid precautions" to address concerns regarding transmission of HIV in the health-care setting *(6).* The concept, now referred to simply as "universal precautions" stresses that **all patients should be assumed to be infectious for HIV and other blood-borne pathogens.** In the hospital and other health-care setting, "universal precautions" should be followed when workers are exposed to blood, certain other body fluids (amniotic fluid, pericardial fluid, peritoneal fluid, pleural fluid, synovial fluid, cerebrospinal fluid, semen, and vaginal secretions), or any body fluid visibly contaminated with blood. Since HIV and HBV transmission has not been documented from exposure to other body fluids (feces, nasal secretions, sputum, sweat, tears, urine, and vomitus), "universal precautions" do not apply to these fluids. Universal precautions also do not apply to saliva, except in the dental setting, where saliva is likely to be contaminated with blood (see Appendix A, page 32).

For the purpose of this document, human "exposure'! is defined as contact with blood or other body fluids to which universal precautions apply through percutaneous inoculation or contact with an open wound. nonintact skin, or mucous membrane during the performance of normal job duties. An "exposed worker" is defined, for the purposes of this document, as an individual exposed, as described above, while performing normal job duties.

The unpredictable and emergent nature of exposures encountered by emergency and public-safety workers may make differentiation between hazardous body fluids and those which arc not hazardous very difficult and often impossible. For example, poor lighting may limit the worker's ability to detect visible blood in

vomitus or feces, Therefore, **when emergency medical and public-safety workers encounter body fluids under uncontrolled, emergency circumstances in which differentiation between fluid types Is difficult, if not impossible, they should treat all body fluids as potentially hazardous.**

The application of the principles of universal precautions to the situations encountered by these workers results in the development of guidelines (listed below) for work practices, use of personal protective equipment, and other protective measures. To minimize the risks of acquiring HIV and HBV during performance of job duties, emergency and public-safety workers should be protected from exposure to blood and other body fluids as circumstances dictate. Protection can be achieved through adherence to work practices designed to minimize or eliminate exposure and through use of personal protective equipment (i.e., gloves, masks, and protective clothing), which provide a barrier between the worker and the exposure source. In some situations, redesign of selected aspects of the job through equipment modifications or environmental control can further reduce risk. These approaches to primary prevention should be used together to achieve maximal reduction of the risk of exposure.

If exposure of an individual worker occurs, medical management, consisting of collection of pertinent medical and occupational history, provision of treatment, and counseling regarding future work and personal behaviors, may reduce risk of developing disease as a result of the exposure episode *(22)*. Following episodic (or continuous) exposure, decontamination and disinfection of the work environment, devices, equipment, and clothing or other forms of personal protective equipment can reduce subsequent risk of exposures. Proper disposal of contaminated waste has similar benefits.

III. Employer Responsibilities

A. General

Detailed recommendations for employer responsibilities in protecting workers from acquisition of blood-borne diseases in the workplace have been published in the Department of Labor and Department of Health and Human Services Joint Advisory Notice and are summarized here *(4).* In developing programs to protect workers, employers should follow a series of steps: 1) classification of work activity, 2) development of standard operating procedures; 3) provision of training and education, 4) development of procedures to ensure and monitor compliance, and 5) workplace redesign: As a first step, every employer should classify work activities into one of three categories of potential exposure (see Table 3; page 27). Employers should make protective equipment available to all workers when they are engaged in Category I or II activities. Employers should ensure that the appropriate protective equipment is used by workers when they perform Category I activities.

As a second step, employers should establish a detailed work practices program that includes standard operating procedures (SOPs) for all activities having the potential for exposure. Once these SOPs are developed, an initial and periodic worker education program to assure familiarity with work practices should be provided to potentially exposed workers. No worker should engage in such tasks or activities before receiving training pertaining to the SOPs, work practices, and protective equipment required for that task. Examples of personal protective equipment for the prehospital setting (defined as a setting where delivery of emergency health care takes place away from a hospital or other health-care setting) are provided in Table 4 (page 28). (A curriculum for such training programs is being developed in conjunction with these guidelines and should be consulted for further information concerning such training programs.)

To facilitate and monitor compliance with SOPs, administrative procedures should be developed and records kept as described in the Joint Advisory Notice (4). Employers should monitor the workplace to ensure that required work practices are observed and that protective clothing and equipment are provided and properly used. The employer should maintain records documenting the administrative procedures used to classify job activities and copies of all SOPs for tasks or activities involving predictable or unpredictable exposure to blood or other body fluids to which universal precautions apply. In addition, training records, indicating the dates of training sessions, the content of those training sessions along with the names of all persons conducting the training, and the names of all those receiving training should also be maintained.

Whenever possible, the employer should identify devices and other approaches to modifying the work environment which will reduce exposure risk. Such approaches are desirable, since they don't require individual worker action or management activity. For example, jails and correctional facilities should have classification procedures that require the segregation of offenders who indicate through their actions or words that they intend to attack correctional-facility staff with the intent of transmitting HIV or HBV.

B. Medica1

In addition to the general responsibilities noted above, the employer has the specific responsibility to make available to the worker a program of medical management. This program is designed to provide for the reduction of risk of infection by HBV and for counseling workers concerning issues regarding HIV and HBV. These services should be provided by a licensed health professional. All phases of medical management and counseling should ensure that the confidentiality of the worker's and client's medical data is protected.

1. Hepatitis B vaccination

All workers whose jobs involve participation in tasks or activities with exposure to blood or other body fluids to which universal precautions apply (as defined above on page 6) should be vaccinated with hepatitis B vaccine.

2. Management of percutaneous exposure to blood and other infectious body fluids

Once an exposure has occurred (as defined above on page 6), a blood sample should be drawn after consent is obtained from the individual from whom exposure occurred and tested for hepatitis B surface antigen (HBsAg) and antibody to human immunodeficiency virus (HIV antibody). Local laws regarding consent for testing source individuals should be followed. Policies should be available for testing source individuals in situations where consent cannot be obtained (e.g., an unconscious patient). Testing of the source individual should be done at a location where appropriate pretest counseling is available; posttest counseling and referral for treatment should be provided It is extremely important that all individuals who seek consultation for any HIV-related concerns receive counseling as outlined in the "Public Health Service Guidelines for Counseling and Antibody Testing to Prevent HIV Infection and AIDS" *(22).*

a. Hepatitis B virus postexposure management

For an exposure to a source individual found to be positive for HBsAg, the worker who has not previously been given hepatitis B vaccine should receive the vaccine series. A single dose of hepatitis B immune globulin (HBIG) is also recommended, if this can be given within 7 days of exposure. For exposures from an HBsAg-positive source to workers who have previously received vaccine, the exposed worker should be tested for antibody to hepatitis B surface antigen (anti-HBs), and given one dose of vaccine and one dose of HBIG if the antibody level in the worker's blood sample is inadequate (i.e., < 10 SRU by RIA, negative by EIA) *(5).*

If the source individual is negative for HBsAg and the worker has not been vaccinated, this opportunity should be taken to provide hepatitis B vaccination.

If the source individual refuses testing or he/she cannot be identified, the unvaccinated worker should receive the hepatitis B vaccine series. HBIG administration should be considered on an individual basis when the source individual is known or suspected to be at high risk of HBV infection. Management and treatment, if any, of previously vaccinated workers who receive an exposure from a source who refuses testing or is not identifiable should be individualized *(5).*

b. Human immunodeficiency virus postexposure management

For any exposure to a source individual who has AIDS, who is found to be positive for HIV infection (as defined in Appendix B, see page 42). or who refuses testing, the worker should be counseled regarding the risk of infection and evaluated clinically and serologically for evidence of HIV infection as soon as possible after the exposure. In view of the evolving nature of HIV postexposure management, the health-care provider should be well informed of current PHS guidelines on this subject. The worker should be advised to report and seek medical evaluation for any acute febrile illness that occurs within 12 weeks after the exposure. Such an illness, particularly one characterized by fever, rash, or lymphadenopathy, may be indicative of recent HIV infection. Following the initial test at the time of exposure,

seronegative workers should be retested 6 weeks, 12 weeks, and 6 months after exposure to determine whether transmission has occurred. During this follow-up period (especially the first 6-12 weeks after exposure, when most infected persons are expected to seroconvert), exposed workers should follow U.S. Public Health Service (PHS) recommendations for preventing transmission of HIV *(22).* These include refraining from blood donation and using appropriate protection during sexual intercourse *(23).* During all phases of follow-up, it is vital that worker confidentiality be protected.

If the source individual was tested and found to be seronegative, baseline testing of the exposed worker with follow-up testing 12 weeks later may be performed if desired by the worker or recommended by the health-care provider.

If the source individual cannot be identified, decisions regarding appropriate follow-up should be individualized. Serologic testing should be made available by the employer to all workers who may be concerned they have been infected with HIV through an occupational exposure as defined above (see page 6).

3. Management of human bites

On occasion, police and correctional-facility officers are intentionally bitten by suspects or prisoners. When such bites occur, routine medical and surgical therapy (including an assessment of tetanus vaccination status) should be implemented as soon as possible, since such bites frequently result in infection with organisms other than HIV and HBV. Victims of bites should be evaluated as described above (see page 9) for exposure to blood or other infectious body fluids.

(As noted below in Appendix A, page 32, saliva of some persons infected with HBV has been shown to contain HBV-DNA at concentrations 1/1,000 to 1/10,000 of that found in the infected person's serum *(24).* HbsAg-positive saliva has been shown to be infectious when injected into experimental animals and in human bite exposures *(25-27).* However, HBsAg-positive saliva has not been shown to be infectious when applied to oral mucous membranes in experimental primate studies *(27)* or through contamination of musical instruments or cardiopulmonary resuscitation dummies used by HBV carriers *(28,29).* Epidemiologic studies of nonsexual household contacts of HIV-infected patients, including several small series in which HIV transmission failed to occur after bites or after percutaneous inoculation or contamination of cuts and open wounds with saliva from HIV-infected patients, suggest that the potential for salivary transmission of HIV is remote *(7,30,31,32,33).* One case report from Germany has suggested the possibility of transmission of HIV in a household setting from an infected child to a sibling through a human bite *(34).* The bite did not break the skin or result in bleeding. Since the date of seroconversion to HIV was not known for either child in this case, evidence for the role of saliva in the transmission of virus is unclear *(34).)*

4. Documentation of exposure and reporting

As part of the confidential medical record, the circumstances of exposure should be recorded. Relevant information includes the activity in which the worker was engaged at the time of exposure, the extent to which appropriate work practices and protective equipment were used, and a description of the source of exposure.

Employers have a responsibility under various federal and state laws and regulations to report occupational illnesses and injuries. Existing programs in the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services; the Bureau of Labor Statistics,

Department of Labor (DOL); and the Occupational Safety and Health Administration (DOL) receive such information for the purposes of surveillance and other objectives. Cases of infectious disease, including AIDS and HBV infection, are reported to the Centers for Disease Control through State health departments.

5. Management of HBV- or HIV-infected workers

Transmission of HBV from health-care workers to patients has been documented Such transmission has occurred during certain types of invasive procedures (e.g., oral and gynecologic surgery) in which health-care workers, when tested, had very high concentrations of HBV in their blood (at least 100 million infectious virus particles per milliliter, a concentration much higher than occurs with HIV infection), and the health-care workers sustained a puncture wound while performing invasive procedures or had exudative or weeping lesions or microlacerations that allowed virus to contaminate instruments or open wounds of patients *(35,36)*. A worker who is HBsAg positive and who has transmitted hepatitis B virus to another individual during the performance of his or her job duties should be excluded from the performance of those job duties which place other individuals at risk for acquisition of hepatitis B infection.

Workers with impaired immune systems resulting from HIV infection or other causes are at increased risk of acquiring or experiencing serious complications of infectious disease. Of particular concern is the risk of severe infection following exposure to other persons with infectious diseases that are easily transmitted if appropriate precautions are not taken (e.g., measles, varicella). Any worker with an impaired immune system should be counseled about the potential risk associated with providing health care to persons with any transmissible infection and should continue to follow existing recommendations for infection control to minimize risk of exposure to other infectious agents *(2,3).* Recommendations of the Immunization Practices Advisory Committee (ACIP) andinstitutional policies concerning requirements for vaccinating workers with live-virus vaccines (e.g., measles, rubella) should also be considered.

The question of whether workers infected with HIV can adequately and safely be allowed to perform patient-care duties or whether their work assignments should be changed must be determined on an individual basis. These decisions should be made by the worker's personal physician(s) in conjunction with the employer's medical advisors.

C. Disinfection, Decontamination, and Disposal

As described in Section I.C. (see page 2), the only documented occupational risks of HIV and HBV infection are associated with parenteral (including open wound) and mucous membrane exposure to blood and other potentially infectious body fluids. Nevertheless, the precautions described below should be routinely followed.

1. Needle and sharps disposal

All workers should take precautions to prevent injuries caused by needles, scalpel blades, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures. To prevent needle-stick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal; the puncture-resistant containers should be located as close as practical to the use area (e.g., in the

ambulance or, if sharps are carried to the scene of victim assistance from the ambulance, a small puncture-resistant container should be carried to the scene, as well). Reusable needles should be left on the syringe body and should be placed in a puncture-resistant container for transport to the reprocessing area.

2 Hand washing

Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood, other body fluids to which universal precautions apply, or potentially contaminated articles. Hands should always be washed after gloves are removed, even if the gloves appear to be intact. Hand washing should be completed using the appropriate facilities, such as utility or restroom sinks. Waterless antiseptic hand cleanser should be provided on responding units to use when hand-washing facilities are not available. When hand-washing facilities are available, wash hands with warm water and soap. When hand-washing facilities are not available, use a waterless antiseptic hand cleanser. The manufacturer's recommendations for the product should be followed.

3. Cleaning, disinfecting, and sterilizing

Table 5 (see pages 29, 30) presents the methods and applications for cleaning, disinfecting, and sterilizing equipment and surfaces in the prehospital setting. These methods also apply to housekeeping and other cleaning tasks. Previously issued guidelines for health-care, workers contain more detailed descriptions of these procedures and may be found in Appendix B (see page 40).

4. Cleaning and decontaminating spills of blood

All spills of blood and blood-contaminated fluids should be promptly cleaned up using an EPA-approved germicide or a 1:100 solution of household bleach in the following manner while wearing **gloves.** Visible material should first be removed with disposable towels or other appropriate means that will ensure against direct contact with blood. If splashing is anticipated, protective eyewear should be worn along with an impervious gown or apron which provides an effective barrier to splashes. The area should then be decontaminated with an appropriate germicide. Hands should be washed following removal of gloves. Soiled cleaning equipment should be cleaned and decontaminated or placed in an appropriate container and disposed of according to agency policy. Plastic bags should be available for removal of contaminated items from the site of the spill.

Shoes and boots can become contaminated with blood in certain instances. Where there is massive blood contamination on floors, the use of disposable impervious shoe coverings should be considered. Protective gloves should be worn to remove contaminated shoe coverings. The coverings and gloves should be disposed of in plastic bags. A plastic bag should be included in the crime scene kit or the car which is to be used for the disposal of contaminated items. Extra plastic bags should be stored in the police cruiser or emergency vehicle.

5. Laundry

Although soiled linen may be contaminated with pathogenic microorganisms, the risk of actual disease transmission is negligible. Rather than rigid procedures and specifications, hygienic storage and processing of clean and soiled linen are recommended. Laundry facilities and/or services should be made routinely available by the employer. Soiled linen should be handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. All soiled linen should be bagged at the location where it was used. Linen soiled with blood

should be placed and transported in bags that prevent leakage. Normal laundry cycles should be used according to the washer and detergent manufacturers' recommendations.

6. Decontamination and laundering of protective clothing

Protective work clothing contaminated with blood or other body fluids to which universal precautions apply should be placed and transported in bags or containers that prevent leakage. Personnel involved in the bagging, transport, and laundering of contaminated clothing should wear gloves. Protective clothing and station and work uniforms should be washed and dried according to the manufacturer's instructions. Boots and leather goods may be brush-scrubbed with soap and hot water to remove contamination.

7. Infective waste

The selection of procedures for disposal of infective waste is determined by the relative risk of disease transmission and application of local regulations, which vary widely. **In all cases, local regulations should be consulted prior to disposal procedures and followed.** Infective waste, in general, should either be incinerated or should be decontaminated before disposal in a sanitary landfill Bulk blood, suctioned fluids, excretions, and secretions may be carefully poured down a drain connected to a sanitary sewer, where permitted. Sanitary sewers may also be used to dispose of other infectious wastes capable of being ground and flushed into the sewer, where permitted. Sharp items should be placed in puncture-proof containers and other blood-contaminated items should be placed in leak-proof plastic bags for transport to an appropriate disposal location.

Prior to the removal of protective equipment, personnel remaining on the scene after the patient has been cared for should carefully search for and remove contaminated materials. Debris should be disposed of as noted above.

IV. Fire and Emergency Medical Services

The guidelines that appear in this section apply to fire and emergency medical services. This includes structural fire fighters, paramedics, emergency medical technicians, and advanced life support personnel Fire fighters often provide emergency medical services and therefore encounter the exposures common to paramedics and emergency medical technicians. Job duties are often performed in uncontrolled environments, which, due to a lack of time and other factors, do not allow for application of a complex decision-making process to the emergency at hand.

The general principles presented here have been developed from existing principles of occupational safety and health in conjunction with data from studies of health-care workers in hospital settings. The basic premise is that workers must be protected from exposure to blood and other potentially infectious body fluids in the course of their work activities. There is a paucity of data concerning the risks these worker groups face, however, which complicates development of control principles. Thus, the guidelines presented below are based on principles of prudent public health practice.

Fire and emergency medical service personnel are engaged in delivery of medical care in the prehospital setting. The following guidelines are intended to assist these personnel in making decisions concerning use of personal protective equipment and resuscitation equipment, as well as for decontamination, disinfection, and disposal procedures.

A. Personal Protective Equipment

Appropriate personal protective equipment should be made available routinely by the employer to reduce the risk of exposure as defined above. For many situations, the chance that the rescuer will be exposed to blood and other body fluids to which universal precautions apply can be determined in advance. Therefore, if the chances of being exposed to blood is high (e.g., CPR, IV insertion, trauma, delivering babies), the worker should put on protective attire before beginning patient care. Table 4 (see page 28) sets forth examples of recommendations for personal protective equipment in the prehospital setting; the list is not intended to be au-inclusive.

1. Gloves

Disposable gloves should be a standard component of emergency response equipment, and should be donned by all personnel prior to initiating any emergency patient care tasks involving exposure to blood or other body fluids to which universal precautions apply. Extra pairs should always be available. Considerations in the choice of disposable gloves should include dexterity, durability, fit, and the task being performed Thus, there is no single type or thickness of glove appropriate for protection in all situations. For situations where large amounts of blood are likely to be encountered, it is important that gloves fit tightly at the wrist to prevent blood contamination of hands around the cuff. For multiple trauma victims, gloves should be changed between patient contacts, if the emergency situation allows.

Greater personal protective equipment measures are indicated for situations where broken glass and sharp edges are likely to be encountered, such as extricating a person from an automobile wreck. Structural fire-fighting gloves that meet the Federal OSHA requirements for fire-fighters gloves (as contained in 29 CFR 1910.156 or National Fire Protection Association Standard 1973, Gloves for Structural Fire Fighters) should be worn in any situation where sharp or rough surfaces are likely, to be encountered *(37);*

While wearing gloves, avoid handling personal items, such as combs and pens, that could become soiled or contaminated. Gloves that have become contaminated with blood or other body fluids to which universal precautions apply should be removed as soon as possible, taking care to avoid skin contact with the exterior surface. Contaminated gloves should be placed and transported in bags that prevent leakage and should be disposed of or, in the case of reusable gloves, cleaned and disinfected properly.

2. Masks, eyewear, and gowns

Masks, eyewear, and gowns should be present on all emergency vehicles that respond or potentially respond to medical emergencies or victim rescues. These protective barriers should be used in accordance with the level of exposure encountered. Minor lacerations or small amounts of blood do *not* merit the same extent of barrier use as required for exsanguinating victims or massive arterial bleeding. Management of the patient who is not bleeding, and who has no bloody body fluids present, should not routinely require use of barrier precautions. Masks and eyewear (e.g., safety glasses) should be worn together, or a faceshield should be used by all personnel prior to any situation where splashes of blood or other body fluids to which universal precautions apply are likely to occur, Gowns or aprons should be worn to protect clothing from splashes with blood. If large splashes or quantities of blood are present or anticipated, impervious gowns or aprons should be worn. An extra change of work clothing should be available at all times.

3. Resuscitation equipment

No transmission of HBV or HIV infection during mouth-to-mouth resuscitation has been documented, However, because of the risk of salivary transmission of other infectious diseases *(e.g., Herpes simplex* and *Neisseria mertingitidis)* and the theoretical risk of HIV and HBV transmission during artificial ventilation of trauma victims, disposable airway equipment or resuscitation bags should be used Disposable resuscitation equipment and devices should be used once and disposed of or, if reusable, thoroughly cleaned and disinfected after each use according to the manufacturer's recommendations.

Mechanical respiratory assist devices (e.g., bag-valve masks, oxygen demand valve resuscitators) should be available on all emergency vehicles and to all emergency response personnel that respond or potentially respond to medical emergencies or victim rescues.

Pocket mouth-to-mouth resuscitation masks designed to isolate emergency response personnel (i.e., double lumen systems) from contact with victims' blood and blood-contaminated saliva, respiratory secretions, and vomitus should be provided to all personnel who provide or potentially provide emergency treatment.

V. Law-Enforcement and Correctional-Facility Officers

Law-enforcement and correctional-facility officers may face the risk of exposure to blood during the conduct of their duties. For example, at the crime scene or during processing of suspects, law-enforcement officers may encounter blood-contaminated hypodermic needles or weapons, or be called upon to assist with body removal. Correctional-facility officers may similarly be required to search prisoners or their cells for hypodermic needles or weapons, or subdue violent and combative inmates.

The following section presents information for reducing the risk of acquiring HIV and HBV infection by law-enforcement and correctional-facility officers as a consequence of carrying out their duties. However, there is an extremely diverse range of potential situations which may occur in the control of persons with unpredictable, violent, or psychotic behavior. Therefore, informed judgment of the individual officer is paramount when unusual circumstances or events arise. These recommendations should serve as an adjunct to rational decision making in those situations where specific guidelines do not exist, particularly where immediate action is required to preserve life or prevent significant injury.

The following guidelines are arranged into three sections: a section addressing concerns shared by both law-enforcement and correctional-facility officers, and two sections dealing separately with law-enforcement officers and correctional-facility officers, respectively. Table 4 (see page 28) contains selected examples of personal protective equipment that may be employed by law-enforcement and correctional-facility officers.

A. Law-Enforcement and Correctional-Facilities Considerations

1. Fights and assaults

Law-enforcement and correctional-facility officers are exposed to a range of assaultive and disruptive behavior through which they may potentially become exposed to blood or other body fluids containing blood. Behaviors of particular concern are biting, attacks resulting in blood exposure, and attacks with sharp objects. Such behaviors may occur in a range of law-enforcement situations including arrests, routine interrogations, domestic disputes, and lockup operations, as well as in correctional-facility activities. Hand-to-hand combat may result in bleeding and may thus incur a greater chance for blood-to-blood exposure, which increases the chances for blood-borne disease transmission.

Whenever the possibility for exposure to blood or blood-contaminated body fluids exists, the appropriate protection should be worn, if feasible under the circumstances. In all cases, extreme caution must be used in dealing with the suspect or prisoner if there is any indication of assaultive or combative behavior. When blood is present and a suspect or an inmate is combative or threatening to staff, gloves should always be put on as soon as conditions permit. In case of blood contamination of clothing, an extra change of clothing should be available at all times.

2. Cardiopulmonary resuscitation

Law enforcement and correctional personnel are also concerned about infection with HIV: and HBV through administration of cardiopulmonary resuscitation (CPR). Although there have been no documented cases of HIV transmission through this mechanism, the possibility of transmission of other infectious diseases exists. Therefore, agencies should make protective masks or airways available to officers and provide training in their proper use. Devices with one-way valves to prevent the patients saliva or vomitus from entering the caregiver’s mouth are preferable.

B. Law-Enforcement Considerations

1. Searches and evidence handling

Criminal justice personnel have potential risks of acquiring HBV or HIV infection through exposures which occur during searches and evidence handling. Penetrating injuries are known to occur, and puncture wounds or needle sticks in particular pose a hazard during searches of persons, vehicles, or cells, and during evidence handling. The following precautionary measures will help to reduce the risk of infection:

- An officer should use great caution in searching the clothing of suspects. Individual discretion, based on the circumstances at hand, should determine if a suspect or prisoner should empty his own pockets or if the officer should use his own skills in determining the contents of a suspect's clothing.
- A safe distance should always be maintained between the officer and the suspect.
- Wear protective gloves if exposure to blood is likely to be encountered.
- Wear protective gloves for all body cavity searches.
- If cotton gloves are to be worn when working with evidence of potential latent fingerprint value at the crime scene, they can be worn over protective disposable gloves when exposure to blood may occur.
- Always carry a flashlight, even during daylight shifts, to search hidden areas. Whenever possible, use long-handled mirrors and flashlights to search such areas (e.g., under car seats).
- If searching a purse, carefully empty contents directly from purse, by turning it upside down over a table.
- Use puncture-proof containers to store sharp instruments and clearly marked plastic bags to store other possibly contaminated items.
- To avoid tearing gloves, use evidence tape instead of metal staples to seal evidence.
- Local procedures for evidence handling should be followed. In general, items should be air dried before sealing in plastic.

Not all types of gloves are suitable for conducting searches. Vinyl or latex rubber gloves provide little protection against sharp instruments, and they are not puncture-proof. There is a direct trade-off between level of protection and manipulability. In other words, the thicker the gloves, the more protection they provide, but the less effective they are in locating objects. Thus, there is no single type or thickness of glove appropriate for protection in all situations. Officers should select the type and thickness of glove which provides the best balance of protection and search efficiency.

Officers and crime scene technicians may confront unusual hazards, especially when the crime scene involves violent behavior, such as a homicide where large amounts of blood are present. Protective gloves should be available and worn in this setting. In addition, for very large spills, consideration should be given to other protective clothing, such as overalls, aprons, boots, or protective shoe covers.

They should be changed if torn or soiled, and always removed prior to leaving the scene. While wearing gloves, avoid handling personal items, such as combs and pens, that could become soiled or contaminated.

Face masks and eye protection or a face shield are required for laboratory and evidence technicians whose jobs which entail potential exposures to blood via a splash to the face, mouth, nose, or eyes.

Airborne particles of dried blood may be generated when a stain is scraped. It is recommended that protective masks and eyewear or face shields be worn by laboratory or evidence technicians when removing the blood stain for laboratory analyses.

While processing the crime scene, personnel should be alert for the presence of sharp objects such as hypodermic needles, knives, razors, broken glass, nails, or other sharp objects.

2. Handling deceased persons and body removal

For detectives, investigators, evidence technicians, and others who may have to touch or remove a body, the response should be the same as for situations requiring CPR or first aid: wear gloves and cover all cuts and abrasions to create a barrier and carefully wash all exposed-areas after any contact with blood. The precautions to be used with blood and deceased persons should also be used when handling amputated limbs, hands, or other body parts. Such procedures should be followed after contact with the blood of anyone, regardless of whether they are known or suspected to be infected with HIV or HBV.

3. Autopsies

Protective masks and eyewear (or face shields), laboratory coats, gloves, and waterproof aprons should be worn when performing or attending all autopsies. All autopsy material should be considered infectious for both HIV and HBV. Onlookers with an opportunity for exposure to blood splashes should be similarly protected. Instruments and surfaces contaminated during postmortem procedures should be decontaminated with an appropriate chemical germicide following recommendations in Appendix B, page 40. Many laboratories have more detailed standard operating procedures for conducting autopsies; where available, these should be followed. (More detailed recommendations for health-care workers in this setting are found in Appendix B, page 39.)

4. Forensic laboratories

Blood from all individuals should be considered infective. To supplement other worksite precautions, the following precautions are recommended for workers in forensic laboratories.

a. All specimens of blood should be put in a well-constructed. appropriately labelled container with a secure lid to prevent leaking during transport. Care should be taken when collecting each specimen to avoid contaminating the outside of the container and of the laboratory form accompanying the specimen.

b. All persons processing blood specimens should wear gloves. Masks and protective eyewear or face shields should be worn if mucous-membrane contact with blood is anticipated (e.g., removing tops from vacuum tubes). Hands should be washed after completion of specimen processing.

c. For routine procedures, such as histologic and pathologic studies or microbiological culturing, a biological safety cabinet is not necessary. However, biological safety cabinets (Class I or II) should be used whenever procedures are conducted that have a high potential for generating droplets. These include activities such as blending, sonicating, and vigorous mixing.

d. Mechanical pipetting devices should be used for manipulating all liquids in the laboratory. Mouth pipetting must not be done.

e. Use of needles and syringes should be limited to situations in which there is no alternative, and the recommendations for preventing injuries with needles outlined under universal precautions should be followed.

f. Laboratory work surfaces should be cleaned of visible materials and then decontaminated with an appropriate chemical germicide after a spill of blood, semen, or blood-contaminated body fluid and when work activities are completed

g. Contaminated materials used in laboratory tests should be decontaminated before reprocessing or be placed in bags and disposed of in accordance with institutional and local regulatory policies for disposal of infective waste.

h. Scientific equipment that has been contaminated with blood should be cleaned and then decontaminated before being repaired in the laboratory or transported to the manufacturer.

i. All persons should wash their hands after completing laboratory activities and should remove protective clothing before leaving the laboratory.

j. Area posting of warning signs should be considered to remind employees of continuing hazard of infectious disease transmission in the laboratory setting.

C. Correctional-Facility Considerations

1. Searches

Penetrating injuries are known to occur in the correctional-facility setting, and puncture wounds or needle sticks in particular pose a hazard during searches of prisoners or their cells. The following precautionary measures will help to reduce the risk of infection:

- A correctional-facility officer should use great caution in searching the clothing of prisoners, Individual discretion, based on the circumstances at hand, should determine if a prisoner should empty his own pockets or if the officer should use his own skills in determining the contents of a prisoner’s clothing.

- A safe distance should always be maintained between the officer and the prisoner,

- Always carry a flashlight, even during daylight shifts, to search hidden areas. ‘Whenever possible, use long-handled mirrors and flashlights to search such areas (e.g., under commodes, bunks, and in vents in jail cells).

- Wear protective ‘gloves if exposure to blood is likely to be encountered.

- Wear protective gloves for all body cavity searches.

Not all types of gloves are suitable for conducting searches. Vinyl or latex rubber gloves can provide little, if any, protection against sharp instruments, and they are not puncture-proof. There is a direct trade-off between level of protection and manipulability. In other words, the thicker the gloves, the more protection they provide, but the less effective they are in locating objects. Thus, there is no single type or thickness of glove appropriate for protection in all situations. Officers should select the type and thickness of glove which provides the best balance of protection and search efficiency.

2. Decontamination and disposal

Prisoners may spit at officers and throw feces; sometimes these substances have been purposefully contaminated with blood. Although there are no documented cases of HIV or HBV transmission in this manner and transmission by this route would not be expected to occur, other diseases could be transmitted. These materials should be removed with a paper towel after donning gloves, and the area then decontaminated with an appropriate germicide. Following clean-up, soiled towels and gloves should be disposed of properly.

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VII. Tables

Table 1. The Risk of HIV Infection
Following Needlestick Injury: Hypothetical Model

Prevalence of HIV Infection (A)	**Probability. of Infection Given Needlestick Injury with Blood Containing HIV (B)**	**Probability of Infection Given Random Needlestick (Unknown Serostatus) A * B = (C)**	**Probability of infection Given 10 Random Needlesticks $1-(1-C)^{10}$**	**Probability of Infection Given 100 Random Needles ticks $1-(1-C)^{100}$**
0.0001	0.001	0.0000001	0.000001	0.00001
0.0001	0.005	0.0000005	0.000005	0.00005
0.001	0.001	0.000001	0.00001	0.0001
0.001	0.005	0.000005	0.00005	0.0005
0.01	0.001	0.00001	0.0001	0.001
0.01*	0.005	0.00005	0.0005	0.005
0.05	0.001	0.00005	0.000.5	0.005
0.05	0.005	0.00025	0.0025	0.025

* For example, if the prevalence of infection in the population is 0.01 (i.e., 1 per 100) and the risk of a seroconversion following a needlestick with blood known to contain HIV is 0.005 (i.e., 1 in 200), then the probability of HIV infection given a random needlestick is 0.00005 (i.e., 5 in 100,000). If an individual sustains 10 needlestick injuries, the probability of acquiring HIV infection is 0.0005 (i.e., 1 in 2,000); if the individual sustains 100 needlestick injuries, the probability of acquiring HIV infection is 0.005 (i.e., 1 in 200).

Table 2.
HIV-infected health-care workers with no reported nonoccupational risk factors and for whom case histories have been published in the scientific literature
Cases with Documented Seroconversion

Case	Occupation	Country	Type of Exposure	Source
1*	NS†	United States	Needlestick	AIDS patient
2	NS	United States	Needlestick	AIDS patient
3	NS	United States	Needlestick	AIDS patient
4	NS	United States	2 Needlesticks	AIDS patient, HIV-infected patient
5	NS	United States	Needlestick	AIDS patient
6	Nurse	England	Needlestick	AIDS patient
7	Nurse	France	Needlestick	HIV-infected patient
8	Nurse	Martinique	Needlestick	AIDS patient
9	Research lab worker	United States	Cut with sharp object	Concentrated virus
10	Home health-care worker	United States	Cutaneous #	AIDS patient
11	NS	United States	Nonintact skin	AIDS patient
12	Phlebotomist	United States	Mucous-membrane	HIV-infected patient
13	Technologist	United States	Nonintact skin	HIV-infected patient
14	NS	United States	Needlestick	AIDS patient
15	Nurse	Italy	Mucous membrane	HIV-infected patient
16	Nurse	France	Needlestick	AIDS patient
17	Navy medic	United States	Needlestick	AIDS patient
18	Clinical lab worker	United States	Cut with sharp object	AIDS patient

* AIDS case
† Not specified
# Mother who provided nursing care for her child with HIV infection; extensive contact with the child's blood and body secretions and excretions occurred; the mother did not wear gloves and often did not wash her hands immediately after exposure.

Table 2, continued.
HIV-infected health-care workers with no reported nonoccupational risk factors and for whom case histories have been published in the scientific literature

Cases without Documented Seroconversion

Case	Occupation	Country	Type of Exposure	Source
1	NS	United States	Puncture wound	AIDS patient
2	NS	United States	2 Needlesticks	2 AIDS patients
3	Research lab worker	United States	Nonintact skin	Concentrated virus
4	Home health-care provider	England	Nonintact skin	AIDS patient
5	Dentist	United States	Multiple needle-sticks	Unknown
6*	Technician	Mexico	Multiple needle-sticks and mucous-membrane	Unknown
7	Lab worker	United States	Needlestick, puncture wound	Unknown

* AIDS case

Table 3. Summary of Task Categorization and Implications for Persona! Protective Equipment

Joint Advisory Notice Category[1]	Nature of Task/Activity	Personal protective equipment should be: Available?	Worn?
I.	Direct contact with blood or other body fluids to which universal precautions apply	Yes	Yes
II.	Activity performed without blood exposure but exposure may occur in emergency	Yes	No
III.	Task/activity does not entail predictable or unpredictable exposure to blood	No	No

[1]U.S. Department of Labor, U.S. Department of Health and Human Services. Joint advisory notice: protection against occupational exposure to hepatitis B virus (HBV) and human immunodeficiency virus (HIV). Washington, DC: US Department of Labor, US Department of Health and Human Services, 1987.

Table 4. Examples of Recommended Personal Protective Equipment for Worker Protection Against HIV and HBV Transmission[1] in Prehospita1[2] Settings

Task or Activity	Disposable Gloves	Gown	Mask[3]	Protective Eyewear
Bleeding control with with spurting blood	Yes	Yes	Yes	Yes
Bleeding control with minimal bleeding	Yes	No	No	No
Emergency childbirth	Yes	Yes	Yes, if splashing is likely	Yes, if splashing is likely
Blood drawing	At certain times [4]	No	No	No
Starting an intravenous (IV) line	Yes	No	No	No
Endotracheal intubation, esophageal obturator USC	Yes	No	No, unless splashing is likely	No, unless splashing is likely
Oral/nasal suctioning, manually cleaning airway	Yes[5]	No	No, unless splashing is likely	No, unless splashing is likely
Handling and cleaning instruments with microbial contamination	Yes	No, unless soiling is likely	No	No
Measuring blood pressure	NO	No	No	No
Measuring temperature	No	No	No	NO
Giving an injection	No	No	No	No

The examples provided in this table are based on application of universal precautions. Universal precautions are intended to supplemen rather than replace recommendations for routine infection control, such as handwashing and using gloves to prevent gross microbial contamination of hands (e.g., contact with urine or feces).

[2]Defined as setting where delivery of emergency health care takes place away from a hospital or other health-care facility.

[3]Refers to protective masks to prevent exposure of mucous membranes to blood or other potentially contaminated body fluids. The use of resuscitation devices, some of which arc also referred to as "masks," is discussed on page 16.

[4]For clarification see Appendix A, page 33, and Appendix B, page 38.

[5]While not clearly necessary to prevent HIV or HBV transmission unless blood is present, gloves are recommended IO prevent transmission of other agents (e.g., *Herpes simplex).*

Table 5. Reprocessing Methods for Equipment Used in the Prehospital[1] Health-Care Setting

Sterilization:	Destroys:	All forms of microbial life including high numbers of bacterial spores.
	Methods:	Steam under pressure (autoclave), gas (ethylene oxide), dry heat, or immersion in EPA-approved chemical "sterilant" for prolonged period of time, e.g.,, 6-10 hours or according to manufacturers' instructions. Note: liquid chemical "sterilants" should be used only on those instruments that are impossible to sterilize or disinfect with heat.
	Use:	For those instruments or devices that penetrate skin or contact normally sterile areas of the body, e.g., scalpels, needles, etc. Disposable invasive equipment eliminates the need to reprocess these types of items. When indicated, however, arrangements should be made with a health-care facility for reprocessing of reusable invasive instruments.
High-Level Disinfection:	Destroys:	All forms of microbial life except high numbers of bacterial spores.
	Methods:	Hot water pasteurization (80-100 C, 30 minutes) or exposure to an EPA-registered "sterilant" chemical as above, except for a short exposure time (10-45 minutes or as directed by the manufacturer).
	Use:	For reusable instruments or devices that come into contact with mucous membranes {e.g., laryngoscope blades, endotracheal tubes, etc.).
Intermediate-Level Disinfection:	Destroys:	*Mycobacterium tuberculosis*, vegetative bacteria, most viruses, and most fungi, but does not kill bacterial spores.
	Methods:	EPA-registered "hospital disinfectant" chemical germicides that have a label claim for tuberculocidal activity; commercially available hard-surface germicides or solutions containing at least 500 ppm free available chlorine (a 1:100 dilution of common household bleach-approximately ¼ cup bleach per gallon of tap water).
	Use:	For those surfaces that come into contact only with intact skin, e.g., stethoscopes, blood pressure cuffs, splints, etc., and have been visibly contaminated with blood or bloody body fluids. Surfaces must be precleaned of visible material before the germicidal chemical is applied for disinfection.

Low-Level Disinfection:	Destroys:	Most bacteria, some viruses, some fungi, but not *Mycobacterium tuberculosis* or bacterial spores.
	Methods:	EPA-registered "hospital disinfectants" (no label claim for tuberculocidal activity).
	Use:	These agents are excellent cleaners and can be used for routine housekeeping or removal of soiling in the absence of visible blood contamination.
Environmental Disinfection:		Environmental surfaces which have become soiled should be cleaned and disinfected using any cleaner or disinfectant agent which is intended for environmental use. Such surfaces include floors, woodwork, ambulance seats, countertops, etc.
IMPORTANT:		To assure the effectiveness of any sterilization or disinfection process, equipment and instruments must first be thoroughly cleaned of all visible soil.

[1]Defied as setting where delivery of emergency health-care takes place prior to arrival at hospital or other health-care facility.

Appendix A. Update: Universal Precautions for Prevention of Transmission of Human Immunodeficiency Virus, Hepatitis B Virus, and Other Bloodborne Pathogens In Health-Care Settings (Reprinted from Morbidity and Mortality Weekly Report, l988; 37:377-382,387,388.)

Introduction

The purpose of this report is to clarify and supplement the CDC publication entitled "Recommendations for Prevention of HIV Transmission in Health-Care Settings" (I).

In 1983, CDC published a document entitled "Guideline for Isolation Precautions in Hospitals" (2) that contained a section entitled "Blood and Body Fluid Precautions." The recommendations in this section called for blood and body fluid precautions when a patient was known or suspected to be infected with bloodborne pathogens. In August 1987, CDC published a document entitled "Recommendations for Prevention of HIV Transmission in Health-Care Settings" (I). In contrast to the 1983 document, the 1987 document recommended that blood and body fluid precautions be consistently used for all patients regardless of their bloodborne infection status. This extension of blood and body fluid precautions to a1l patients is referred to as "Universal Blood and Body Fluid Precautions" or "Universal Precautions." Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other bloodborne pathogens.

Universal precautions are intended to prevent parenteral, mucous membrane, and nonintact skin exposures of health-care workers to bloodborne pathogens. In addition, immunization with HBV vaccine is recommended as an important adjunct to universal precautions for health-care workers who have exposures to blood (3,4).

Since the recommendations for universal precautions were published in August 1987, CDC and the Food and Drug Administration (FDA) have received requests for clarification of the following Issues: 1) body fluids to which universal precautions apply, 2) use of protective barriers, 3) use of gloves for phlebotomy, 4) selection of gloves for use while observing universal precautions, and 5) need for making changes in waste management programs as a result of adopting universal precautions.

Body Fluids to Which Universal Precautions Apply

Universal precautions apply to blood and to other body fluids containing visible blood. Occupational transmission of HIV and HBV to health-care workers by blood is documented (4,5). Blood is the single most important source of HIV, HBV, and other bloodborne pathogens in the occupational setting. **Infection control efforts for HIV, HBV, and other bloodborne pathogens must focus on preventing exposures to blood as well as on delivery of HBV Immunization.**

Universal precautions also apply to semen and vaginal secretions. Although both of these fluids have been Implicated in the sexual transmission of HIV and HBV, they have not been implicated in occupational transmission from patient to health-can worker. This observation is not unexpected, since exposure to semen in the usual health-care setting is limited, and the routine practice of wearing gloves for performing vaginal examinations protects health-care workers from exposure to potentially Infectious vaginal secretions.

Universal precautions also apply to tissues and to the following fluids: cerebrospinal fluid (CSF), synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid. The risk of transmission of HIV and HBV from these fluids is unknown; epidemiologic studies in the health-care and community setting are currently inadequate to assess the potential risk to health-care workers from occupational cxposures to them. However, HIV has been Isolated from CSF, synovial, and amniotic fluid (6-8), and HBsAg has been detected in synovial fluid, amniotic fluid, and peritoneal fluid (9-11). *One* case of HIV transmission was reported after a percutaneous exposure to bloody pleural fluid obtained by needle aspiration *(12).* Whereas aseptic procedures used to obtain these fluids for diagnostic or therapeutic purposes protect health-care workers from skin exposures, they cannot prevent penetrating injuries due to contaminated needles or other sharp instruments.

Body Fluids to Which Universal Precautions Do Not Apply

Universal precautions do not apply to feces, nasal secretions, sputum, sweat, tears, urine, and vomitus unless they contain visible blood. The risk of transmission of HIV and HBV from these fluids and materials is extremely low or nonexistent. HIV has been isolated and HBsAg has been demonstrated in some of these fluids; however, epidemiologic studies in the healthcare and community setting have not implicated these fluids or materials in the transmission of HIV and HBV infections (13,14). Some of the above fluids and excretions

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* The August 1987 publication should be consulted for general information and specific recommendations not addressed in this update.

represent a potential source for nosocomial and community-squired infections with other pathogens, and recommendations for preventing the transmission of non-bloodborne pathogens have been published (2).

Precautions for Other Body Fluids In Special Settings

Human breast milk has been implicated in perinatal transmission of HIV, and HBsAg has been found in the milk of mothers infected with HBV *(10,23).* However, occupational exposure to human breast milk has not been implicated in the transmission of HIV nor HBV Infection to health care workers. Moreover, the health-care worker will not have the same type of intensive exposure lo breast milk as the nursing neonate. Whereas universal precautions do not apply to human breast milk, gloves may be worn by health-care workers in situations where exposures to breast milk might be frequent, for example, in breast milk banking.

Saliva of some persona infected with HBV has been shown to contain HBV-DNA at concentrations 1/1,000 to l/10,000 of that found in the infected person's serum *(15).* HbsAg-positive saliva has been shown to be infectious when injected into experimental animals and in human bite exposures *(16-18).* However, HBsAg-positive saliva has not been shown to be infectious when applied to oral mucous membranes In experimental primate studies *(18)* or through contamination of musical instruments or cardiopulmonary resuscitation dummies used by HBV carriers *(19,20).* Epidemiologic studies of nonsexual household contacts of HIV-infected patients, including several small series in which HIV transmission failed to occur after bites or after percutaneous inoculation or contamination of cuts and open wounds with saliva from HIV-infected patients, suggest that the potential for salivary transmission of HIV is remote *(5,13,14,21,22).* One case report from Germany has suggested the possibility of transmission of HIV in a household setting from an infected child to a sibling through a human bite *(23).* The bite did not break the skin or result In bleeding. Since the date of seroconversion to HIV was not known for either child in this case, evidence for the role of saliva in the transmission of virus is unclear *(23).* Another case report suggested the possibility of transmission of HIV from husband to wife by contact with saliva during kissing *(24).* However, follow-up studies did not confirm HIV infection in the wife *(21).*

Universal precautions do not apply to saliva. General infection control practices already in existence -including the use of gloves for digital examination of mucous membranes and endotracheal suctioning, and handwashing after exposure lo saliva -should further minimize the minute risk, if any, for salivary transmission of HIV and HBV *(1,25).* Gloves need not be worn when feeding patients and when wiping saliva from the skin.

Special precautions, however, are recommended for dentistry *(1).* Occupationally acquired infection with HBV in dental workers has been documented *(4),* and two possible cases of occupationally acquired HIV infection involving dentists have been reported *(5,26).* During dental procedures, contamination of saliva with blood is predictable, trauma to health-care workers hands is common, and blood spattering may occur. Infection control precautions for dentistry minimize the potential for nonintact skin and mucous membrane contact of dental health-care workers to blood-contaminated saliva of patients. In addition, the use of gloves for oral examinations and treatment in the dental setting may also protect the patient's oral mucous membranes from exposures to blood, which may occur from breaks in the skin of dental workers' hands,

Use of Protective Barriers

Protective barriers reduce the risk of exposure of the health-care worker's skin or mucous membranes to potentially infective materials. For universal precautions, protective barriers reduce the risk of exposure to blood, body fluids containing visible blood, and other fluids to which universal precautions apply. Examples of protective barriers include gloves, gowns, masks, and protective eyewear. Gloves should reduce the Incidence of contamination of hands, but they cannot prevent penetrating injuries due to needles or other sharp instruments. Masks and protective eyewear or face shields should reduce the incidence of contamination of mucous membranes of the mouth, nose; and eyes.

Universal precautions are intended to supplement rather than replace recommendations for routine infection control, such as handwashing and using gloves to prevent gross microbial contamination of hands *(27).* Because specifying the types of barriers needed for every possible clinical situation is impractical, some judgment must be exercised.

The risk of nosocomial transmission of HIV, HBV, and other bloodborne, pathogens can be minimized if health-care workers use the following general guidelines:

1. Take care to prevent injuries when using needles, scalpels, and other sharp instruments or devices; when handling sharp instruments after procedures; when cleaning used instruments; and when disposing of used needles. Do not recap used needles by hand; do nor remove used needles from disposable syringes by hand; and do not bend, break, or otherwise

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* The August 1981 publication should be consulted for general information and specific recommendations not addressed in this update.

manipulate used needles by hand. Place used disposable syringes and needles, scalpel blades, and other sharp items in puncture-resistant containers for disposal. Locate the puncture-resistant containers as close to the use area as is practical.

2. Use protective barriers to prevent exposure to blood, body fluids containing visible blood, and other fluids lo which universal precautions apply. The type of protective barrier(s) should be appropriate for the procedure being performed and the type of exposure anticipated.

3. Immediately and thoroughly wash hands and other skin surfaces that are contaminated with blood, body fluids containing visible blood, or other body fluids to which universal precautions apply.

Glove Use for Phlebotomy

Gloves should reduce the incidence of blood contamination of hands during phlebotomy (drawing blood samples), but they cannot prevent penetrating injuries caused by needles or other sharp instruments. The likelihood of hand contamination with blood containing HIV, HBV, or other bloodborne pathogens during phlebotomy depends on several factors: 1) the skill and technique of the health-care worker, 2) the frequency with which the health-care worker performs the procedure (other factors being equal, the cumulative risk of blood exposure is higher for a health-care worker who performs more procedures), 3) whether the procedure occurs in a routine or emergency situation (where blood contact may be more likely), and 4) the prevalence of infection with bloodborne pathogens in the patient population. The likelihood of infection after skin exposure to blood containing HIV or HBV will depend on the concentration of virus (viral concentration is much higher for hepatitis B than for HIV), the duration of contact, the presence of skin lesions on the hands of the health-care worker, and -for HBV-the immune status of the healthcare worker. Although not accurately quantified, the risk of HIV infection following intact skin contact with infective blood is certainly much less than the 0.5% risk following percutaneous needlestick exposures *(5).* In universal precautions, all blood is assumed to be potentially infective for bloodborne pathogens, but in certain settings (e.g., volunteer blood-donation centers) the prevalence of infection with some bloodborne pathogens (e.g., HIV, HBV) is known to be very low. Some institutions have relaxed recommendations for using gloves for phlebotomy procedures by skilled phlebotomists in settings where the prevalence of bloodborne pathogens is known to be very low.

Institutions that judge that routine gloving for all phlebotomies is not necessary should periodically reevaluate their policy. Gloves should always be available to health-care workers who wish lo use them for phlebotomy. In addition, the following general guidelines apply:

1. Use gloves for performing phlebotomy when the health-care worker has cuts, scratches, or other breaks in his/her skin.

2. Use gloves in situations where the health-care worker judges that hand contamination with blood may occur, for example, when performing phlebotomy on an uncooperative patient.

3. Use gloves for performing finger and/or heel sticks on infants and children.

4. Use gloves when persons are receiving training in phlebotomy.

Selection of Gloves

The Center for Devices and Radiological Health, FDA, has responsibility for regulating the medical glove industry. Medical gloves include those marketed as sterile surgical or nonsterile examination gloves made of vinyl or latex. General purpose utility (“rubber”) gloves are also used in the health-care setting, but they are not regulated by FDA since they are not promoted for medical use. There are no reported differences in barrier effectiveness between intact latex and intact vinyl used to manufacture gloves. Thus, the type of gloves selected should be appropriate for the task being performed.

The following general guidelines are recommended:

1. Use sterile gloves for procedures involving contact with normally sterile areas of the body)

2. Use examination gloves for procedures involving contact with mucous membranes, unless otherwise indicated, and for other patient care or diagnostic procedures that do not require the use of sterile gloves.

3. Change gloves between patient contacts.

4. Do not wash or disinfect surgical or examination gloves for reuse. Washing with surfactants may cause “wicking,” i.e., the enhanced penetration of liquids through undetected holes in the glove. Disinfecting agents may cause deterioration.

5. Use general-purpose utility gloves (e.g., rubber household gloves) for housekeeping chores involving potential blood contact and for instrument cleaning and decontamination procedures. Utility gloves may be decontaminated and reused but should bc discarded if they are peeling, cracked, or discolored, or if they have punctures, tears, or other evidence of deterioration.

Waste Management

Universal precautions are not intended to change waste management programs previously recommended by CDC for health-care settings (I). Policies for defining, collecting, storing, decontaminating, and disposing of Infective waste are generally determined by Institutions In accordance with state and local regulations. Information regarding waste management regulations in health-care settings may be obtained from state or local health departments or agencies responsible for waste management

Reported by: Center for Devices and Radiological Health, Food and Drug Administration. Hospital Infections Program, AIDS Program, and Hepatitis Br, Div of *Viral Diseases, Center for Infectious Diseases, National Institute for Occupational Safety and Health, CDC.*

Editorial Note: Implementation of universal precautions does not eliminate the need for other category- *or* disease-specific isolation precautions, such as enteric precautions for infectious diarrhea or isolation for pulmonary tuberculosis *(1,2).* In addition to universal precautions, detailed precautions have been developed for the following procedures and/or settings in which prolonged or intensive exposures to blood occur: invasive procedures, dentistry, autopsies or morticians' services, dialysis, and the clinical laboratory. These detailed pecautions are found In the August 21,1987, "Recommendations for Prevention of HIV Transmission In Health-Care Settings" *(1).* In addition, specific precautions have been developed for research laboratories *(28).*

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Appendix B. Recommendations for Prevention of HIV Transmission in Health-Care Settings (Reprinted from Morbidity and Mortality Weekly Report 1987; 36 [no. 2S].)

Introduction

Human immunodeficiency virus (HIV), the virus that causes acquired immunodeficiency syndrome (AIDS), is transmitted through sexual contact and exposure to infected blood or blood components and perinatally from mother to neonate HlV has been isolated from blood, semen, vaginal secretions, saliva, tears, breast milk, cerebrospinal fluid, amniotic fluid, and urine and is likely to be isolated from other body fluids, secretions, and excretions. However, epidemiologic evidence has implicated only blood, semen, vaginal secretions, and possibly breast milk in transmission.

The increasing provalence of HIV increases the risk that health-can workers will be exposed to blood from patients infected with HIV, especially when blood and body-fluid precautions are not followed for all patients. Thus, this document emphasizes the need for health-care workers to consider all patients as potentially infected with HIV and/or other blood-borne pathogens and to adhere rigorously to infection control precautions for minimizing the risk of exposure to blood and body fluids of all patients.

The recommendations contained in this document consolidate and update CDC recommendations published earlier for preventing HIV transmission in health-care settings: precautions for clinical and laboratory staffs *(1)* and precautions for healthcare workers and allied professionals *(2);* recommendations for preventing HIV transmission in the workplace *(3)* and during invasive procedures *(4);* recommendations for preventing possible transmission of HIV from tears *(5);* and recommendations for providing dialysis treatment for HIV-infected patients *(6).* These recommendations also update portions of the "Guideline for lsolation Precautions in Hospitals" *(7)* and reemphasize some of the recommendations contained in "Infection Control Practices for Dentistry" *(8).* The recommendations contained in this document have been developal for use in health-care settings and emphasize the need to treat blood and other body fluids from all patients as potentially infective. These same prudent precautions also should be taken in other settings in which persons may be exposed to blood or other body fluids.

Definition of Health-Care Workers

Health-care workers arc defined as persons, including students and trainees, whose activities involve contact with patients or with blood or other body fluids from patients in a health-care setting.

Health-Care Workers with AIDS

As of July 10, 1987, a total of 1,875 (5.8%) of 32,395 adults with AIDS, who had been reported to the CDC national surveillance system and for whom occupational information was available, reported being employed in a health-care or clinical laboratory setting. In comparison, 6.8 million persons-representing 5.6% of the U.S. labor force-were employed in health services. Of the health-care workers with AIDS, 95% have been reported to exhibit high-risk behavior; for the remaining 5%, the means of HIV acquisition was undetermined. Healthcare workers with AIDS were significantly more likely than other workers to have an undetermined risk (5% versus 3%, respectively). For both health-care and non-health-care workers with AIDS, the proportion with an undetermined risk has not increased since 1982.

AIDS Patients initially reported as not belonging to recognized risk groups are investigated by state and local health departments to determine whether possible risk factors exist. Of all health-care workers with AIDS reported to CDC who were initially characterized as not having an identified risk and for whom follow-up information was available, 66% have been reclassified because risk factors were identified or because the patient was found not to meet the surveillance ease definition for AIDS. Of the 87 health-care workers currently categorized as having no identifiable risk, information is incomplete on 16 (18%) because of death or refusal to be interviewed; 38 (44%) arc still being investigated. The remaining 33 (38%) health-care workers were interviewed or had other follow-up information available. The occupations of these 33 were as follows: five physicians (l5%), three of whom were surgeons: one dentist (3%); three nurses (9%); nine nursing assistants (27%); seven housekeeping or maintenance workers (21%); three clinical laboratory technicians (9%); one therapist (3%); and four others who did not have contact with patients (12%). Although 15 of these 33 health-care workers reported parenteral and/or other non-needstick exposure to blood or body fluids from patients in the 10 years preceding their diagnosis of AIDS, none of these. exposures involved a patient with AIDS or known HIV infection.

Risk to Health-Care Workers of Acquiring HIV In Health-Care Settings

Health-care workers with documented percutaneous or mucous-membrane exposures to blood or body, fluids of HIV-infected patients have been prospectively evaluated to determine the risk of infection after such exposures. As of June 30, 1987, 883 health-care workers have been tested for antibody to HIV in an ongoing surveillance project conducted by CDC *(9).* Of these, 708 (80%) had percutaneous exposures to blood, and 175 (20%) had a mucous membrane or an open wound contaminated by blood or body fluid. Of 396 health-

care workers, each of whom had only a convalescent-phase serum sample obtained and tested ≥ 90 days postexposure, one-for whom heterosexual transmission could not be ruled out-was seropositive for HIV antibody. For 425 additional health-care workers, both acute- and convalescent-phase serum samples were obtained and tested; none of 74 health-care workers with nonpercutaneous exposures seroconverted, and three (0.9%) of 351 with percutaneous exposures seroconverted. None of these three healthcare workers had other documented risk factors for infection.

Two other prospective studies lo assess the risk of nosocomial aquisition of HIV infection for health-care workers are ongoing in the United State-s. As of April 30, 1987,332 health-care workers with a total of 453 needlestick or mucous-membrane exposures to the blood or other body fluids of HIV-infected patients were tested for HIV antibody at the National Institutes of Health *(10).* These exposed workers included 103 with needlestick injuries and 229 with mucous-membrane exposures; none had seroconverted. A similar study at the University of California of 129 health-care workers with documented needlestick injuries or mucous-membrane exposures to blood or other body fluids from patients with HIV infection has not identified any seroconversions *(11).* Results of a prospective study in the United Kingdom identified no evidence of transmission among 150 health-care workers with parenteral or mucous-membrane exposures to blood or other body fluids, secretions, or excretions from patients with HIV infection *(12).*

In addition lo health-care workers enrolled in prospective studies, eight persons who provided care to infected patients and denied other risk factors have been reported to have acquired HIV infection. Three of these healthcare workers had needleslick exposures to blood from infected patients *(13-15).* Two were persons who provided nursing care to infected persons; although neither sustained a needlestick, both had extensive contact with blood or other body fluids, and neither observed recommended barrier precautions *(16,17).* The other three were health-care workers with non-needlestick exposures to blood from infected patients *(18).* Although the exact route of transmission for these last three infections is not known, a!! three persons had direct contact of their skin with blood from infected patients, a!! had skin lesions that may have been contaminated by blood, and one also had a mucous-membrane exposure.

A total of 1,231 dentists and hygienists, many of whom practiced in areas with many AIDS cases, participated in a study to determine the prevalence of antibody to HIV; one dentist (0.1%) had HIV antibody. Although no exposure lo a known HIV-infected person could be documented, epidemiologic investigation did not identify any other risk factor for infection. The infected dentist, who also had a history of sustaining needlestick injuries and trauma to his hands, did not routinely wear gloves when providing dental care *(19).*

Precautions To Prevent Transmission of HIV

Universal Precautions

Since medical history and examination cannot reliably identify all patients infected with HIV or other blood-borne pathogens, blood and body-fluid precautions should be consistently used for all patients. This approach. previously recommended by CDC *(3,4),* and referred to as “universal blood and body-fluid precautions” or “universal precautions,” should be used in the care of all patients, especially including those in emergency-care settings in which the risk of blood exposure is increased and the infection status of the patient is usually unknown *(20).*

1. All health-care workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated. Gloves should be worn for touching blood and body fluids, mucous membranes, or non-intact skin of all patients, for handling items or surfaces soiled with blood or body fluids, and for performing venipuncture and other vascular access procedures. Gloves should be changed after contact with each patient. Masks and protective eyewear or face shields should be worn during procedures that ate likely to generate droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose, and eyes. Gowns or aprons should be worn during procedures that are likely to generate splashes of blood or other body fluids.

2. Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood or other body fluids. Hands should be washed immediately after gloves are removed.

3. All health-care workers should take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures. To prevent needlestick injuries. needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal: the puncture-resistant containers should be located as close as practical to the use area. Large-bore reusable needles should be placed in a puncture-resistant container for transport to the reprocessing area.

4. Although saliva has not been implicated in HIV transmission, to minimize the need for emergency mouth-to-mouth resuscitation, mouthpieces, resuscitation bags, or other-ventilation devices should be available for use in areas in which the need for resuscitation is predictable.

5. Health-care workers who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling patient-care equipment until the condition resolves.

6. Pregnant health-care workers are not known to be at greater risk of contracting HIV infection than healthcare workers who are not pregnant; however, if a health-exe worker develops HIV infection during pregnancy, the infant is at risk of infection resulting from perinatal transmission. Because of this risk, pregnant health-care workers should be especially familiar with and strictly adhere to precautions to minimize the risk of HIV transmission.

lmplementation of universal blood and body-fluid precautions for all patients eliminates the need for use of the isolation category of "Blood and Body Fluid Precautions" previously recommended by CDC *(7)* for patients known or suspected to be infected with blood-borne pathogens. Isolation precautions (e.g., enteric, "AFB" [7]) should be used as necessary if associated conditions, such as infectious ‘diarrhea or tuberculosis, arc diagnosed or suspected.

Precautions for Invasive Procedures

In this document, an invasive procedure is defined as surgical entry into tissues, cavities, or organs or repair of major traumatic injuries 1) in an operating or delivery room, emergency department, or outpatient setting, including both physicians' and dentists' offices; 2) cardiac catheterization and angiographic procedures; 3) a vaginal or cesarean delivery or other invasive obstetric procedure during which bleeding may occur; or 4) the manipulation, cutting, or removal of any oral or perioral tissues, including tooth structure, during which bleeding occurs or the potential for bleeding exists. The universal blood and body-fluid precautions listed above, combined with the precautions listed below, should be the minimum precautions for all such invasive procedures.

1. All healthcare workers who participate in invasive procedures must routinely use appropriate barrier precautions to prevent skin and mucous-membrane contact with blood and other body fluids of all patients. Gloves and surgical masks must be worn for all invasive procedures. Protective eyewear or face shields should be worn for procedures that commonly result in the generation of droplets, splashing of blood or other body fluids, or the generation of bone chips. Gowns or aprons made of materials that provide an effective barrier should be worn during invasive procedures that are likely to result in the splashing of blood or other body fluids. All health-care workers who perform or assist in vaginal or cesarean deliveries should wear gloves and gowns when handling the placenta or the infant until blood and amnlotic fluid have been removed from the infant's skin and should wear gloves during post. delivery care of the umbilical cord.

2 If a glove is tom or a needlestick or other injury occurs, the glove should be removed and a new glove used as promptly as patient safety permits; the needle or instrument involved in the incident should also be removed from the sterile field.

Precautions for Dentistry

Blood, saliva, and gingival fluid from all dental patients should be considered infective. Special emphasis should be placed on the following precautions for preventing transmission of blood-borne pathogens in dental practice in both institutional and non-institutional settings.

1. In addition to wearing gloves for contact with oral mucous membranes of all patients, all dental workers should wear surgical masks and protective eyewear or chin-length plastic face shields during dental procedures in which splashing or spattering of blood, saliva, or gingival fluids is likely. Rubber dams, high-speed evacuation, and proper patient positioning, when appropriate, should be utilized to minimize generation of droplets and spatter.

2. Handpieces should be sterilized after use with each patient, since blood, saliva, or gingival fluid of patients may be aspirated into the handpiece or waterline. Handpieces that cannot be sterilized should at least be flushed, the outside surface cleaned and wiped with a suitable chemical germicide, and then rinsed. Handpieces should be flushed at the beginning of the day and after use with each patient. Manufacturers' recommendations should be followed for USC and maintenance of waterlines and check valves and for flushing of handpieces. The same precautions should be used for ultrasonic scalers and air/water syringes.

3. Blood and saliva should be thoroughly and carefully cleaned from material that has been used in the mouth (e.g., impression materials, bite registration), especially before polishing and grinding intraoral devices. Contaminated materials, impressions, and intraoral devices should also be cleaned and disinfected before being handled in the dental laboratory and before they are placed

*General infection-control precautions are more specifically addressed in previous recommendations for infection-control practices for dentistry *(8)*.

In the patient's mouth. Because of the increasing variety of dental materials used intra-orally, dental workers should consult with manufacturers as to the stability of specific materials when using disinfection procedures.

4. Dental equipment and surfaces (that are difficult to disinfect (e.g., light handles or X-ray-unit heads) and that may become contaminated should be wrapped with impervious-backed paper, aluminum foil, or clear plastic wrap. The coverings should be removed and discarded, and clean coverings should be put In place after use with each patient.

Precautions for Autopsies or Morticians' Services

In addition to the universal blood and body-fluid precautions listed above, the following precautions should be used by persons performing postmortem procedures:

1. All persons performing or assisting in postmortem procedures should wear glows, masks, protective eyewear, gowns, and waterproof aprons.

2. Instruments and surfaces contaminated during postmortem procedures should be decontaminated with an appropriate chemical germicide.

Precautions for Dialysis

Patients with end-stage renal disease who arc undergoing maintenance dialysis and who have HIV Infection can be dialyzed In hospital-based or free-standing dialysis units using conventional infection-control precautions *(21).* Universal blood and body-fluid precautions should be used when dialyzing all patients.

Strategies for disinfecting the dialysis fluid pathways of the hemodialysis machine arc targeted to control bacterial contamination and generally consist of using 500-750 parts per million (ppm) of sodium hypochlorite (household bleach) for 30-40 minutes or 1.5%-2.0% formaldehyde overnight. In addition, several chemical germicides formulated to disinfect dialysis machines arc commercially available, None of these protocols or procedures need to be changed for dialyzing patients infected with HIV.

Patients infected with HIV can be dialyzed by either, hemodialysis or peritoneal dialysis and do not need to be isolated from ocher patients. The type of dialysis treatment (ie., hemodialysis or peritoneal dialysis) should be based on the needs of the patient. The dialyzer may be discarded after each use. Alternatively, centers that reuse dialyzers--i.e., a specific single-use dialyzer is issued to a specific patient, removed, cleaned, disinfected, and reused several times on the same patient only-may include HIV-infected patients in the dialyzer-reuse program. An individual dialyzer must never be used on more than one patient.

Precautions for Laboratories

Blood and other body fluids from **all** patients should be considered infective. To supplement the universal blood and body-fluid precautions listed above, the following precautions are recommended for health-care workers in clinical laboratories.

1. All specimens of blood and body fluids should be put in a well-constructed container with a secure lid to prevent leaking during transport. Care should be taken when collecting each specimen to avoid contaminating the outside of the container and of the laboratory form accompanying the specimen.

2. All persons processing blood and body-fluid specimens (e.g., removing tops from vacuum tubes) should wear gloves. Masks and protective eyewear should be worn if mucous-membrane contact with blood or body fluids is anticipated. Gloves should be changed and hands washed after completion of specimen processing.

3. For routine procedures, such as histologic and pathologic studies or microbiologic culturing,, a biological safety cabinet is not necessary. However, biological safety cabinets (Class I or II) should be used whenever procedures are conducted that have a high potential for generating droplets. These include activities such as blending, sonicating, and vigorous mixing.

4. Mechanical pipetting devices should be used for manipulating all liquids in the laboratory. Mouth pipetting must not be done.

5. Use of needles and syringes should be limited to situations in which there is no alternative, and the recommendations for preventing injuries with needles outlined under universal precautions should be followed.

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*Additional precautions for research and industrial laboratories are addressed elsewhere *(22,23).*

6. Laboratory work surfaces should be decontaminated with an appropriate chemical germicide after a spill of blood or other body fluids and when work activities are completed.

7. Contaminated materials used in laboratory tests should be decontaminated before reprocessing or be placed in bags and disposed of in accordance with institutional policies for disposal of infective waste *(24).*

8. Scientific equipment that has been contaminated with blood or other body fluids should be decontaminated and cleaned before being repaired in the laboratory or transported to the manufacturer.

9. All persons should wash their hands after completing laboratory activities and should remove protective clothing before leaving the laboratory.

Implementation of universal blood and body-fluid precautions for all patients eliminates the need for warning labels on specimens since blood and other body fluids from all patients should be considered infective.

Environmental Considerations for HIV Transmission

No environmentally mediated mode of HIV transmission has been documented. Nevertheless, the precautions described below should be taken routinely in the care of all patients.

Sterilization and Disinfection

Standard sterilization and disinfection procedures for patient-care equipment currently recommended for use *(25,26)* In a variety of health-can settings -including hospitals, medical and dental clinics and offices, hemodialysis centers, emergency-care facilities, and long-term nursing-care facilities-are adequate to sterilize or disinfect instruments, devices, or other items contaminated with blood or other body fluids from persons infected with blood-borne pathogens including HIV *(21,23).*

Instruments or devices that enter sterile tissue or the vascular system of any patient or through which blood flows should be sterilized before reuse. Devices or items that contact intact mucous membranes should be sterilized or receive high-level disinfection, a procedure that kills vegetative organisms and viruses but not necessarily large numbers of bacterial spores. Chemical germicides that arc registered with the U.S. Environmental Protection Agency (EPA) as "sterilants" may be used either for sterilization or for high-level disinfection depending on contact time.

Contact lenses used in trial fillings should be disinfected after each filling by using a hydrogen peroxide contact lens disinfecting system or, if compatible, with heat (78 C-80 C [172.4 F-176.0 F]) for 10 minutes.

Medical devices or instruments that require sterilization or disinfection should be thoroughly cleaned before being exposed to the germicide, and the manufacturer's instructions for the use of the germicide should be followed. Further, it is important that the manufacturer's specifications for compatibility of the medical device with chemical germicides be closely followed. Information on specific label claims of commercial germicides can be obtained by writing IO the Disinfectants Branch, Office of Pesticides, Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

Studies have shown that HIV is inactivated rapidly after being exposed lo commonly used chemical germicides at concentrations that are much lower than used in practice *(27-30).* Embalming fluids are similar to the types of chemical germicides that have been tested and found to completely inactivate HIV. In addition to commercially available chemical germicides, a solution of sodium hypochlorite (household bleach) prepared daily is an inexpensive and effective germicide. Concentrations ranging from approximately 500 ppm (1:100 dilution of household bleach) sodium hypochlorite to 5000 ppm (1: 10 dilution of household bleach) are effective depending on the amount of organic material (e.g., blood, mucus) present on the surface to be cleaned and disinfected. Commercially available chemical germicides may be more compatible with certain medical devices that might be corroded by repeated exposure to sodium hypochlorite. especially tO the 1:10 dilution.

Survival of HIV in the Environment

The most extensive study on the survival of HIV after drying involved greatly concentrated HIV samples, i.e., 10 million tissue-culture infectious doses per milliliter *(31).* This concentration is at least 100,000 times greater than (that typically found in the blood or serum of patients with HIV infection. HIV was detectable by tissue-culture techniques 1-3 days after dying. but the rate of inactivation was rapid. Studies performed at CDC have also shown that drying HIV causes a rapid (within several hours.) 1-2 log (90%99%) reduction in HIV concentration. In tissue-culture fluid, cell-free HIV could be detected up to 15 days at room temperature, up to 11 days at 37 C (98.6 F), and up to 1 day if the HIV was cell-associated.

When considered in the context of environmental conditions in health-care facilities, these results do not require any changes In currently recommended sterilization, disinfection, or housekeeping strategies. When medical devices are contaminated with blood or other body fluids, existing recommendations include the cleaning of these instruments, followed by disinfection or sterilization, depending on the type of medical device. These protocols assume "worst-case" conditions of extreme virologic and microbiological contamination, and whether viruses have been inactivated after drying plays no role in formulating these strategies. Consequently, no changes in published procedures for cleaning, disinfecting, or sterilizing need to be made.

Housekeeping

Environmental surfaces such as walls, floors, and other surfaces are not associated with transmission of infections to patients or health-care workers. Therefore, extraordinary attempts to disinfect or sterilize these environmental surfaces arc not necessary. However, cleaning and removal of soil should be done routinely.

Cleaning schedules and methods vary according to the area of the hospital or institution, type of surface to be cleaned, and the amount and type of soil present. Horizontal surfaces (e.g., bedside tables and hard-surfaced flooring) in patient-care areas are usually cleaned on a regular basis, when soiling or spills occur, and when a patient is discharged. Cleaning of walls, blinds, and curtains is recommended only if they are visibly soiled. Disinfectant fogging is an unsatisfactory method of decontaminating air and surfaces and is not recommended.

Disinfectant-detergent formulations registered by EPA can be used for cleaning environmental surfaces, but the actual physical removal of microorganisms by scrubbing is probably at least as important as any antimicrobial effect of the cleaning agent used. Therefore, cost, safety, and acceptability by housekeepers can be the main criteria for selecting any such registered agent. The manufacturers' instructions for appropriate use should be followed.

Cleaning end Decontaminating Spills of Blood or Other Body Fluids

Chemical germicides that are approved for use as "hospital disinfectants" and are tuberculocidal when used at recommended dilutions can be used to decontaminate spills of blood and other body fluids. Strategies for decontaminating spills of blood and other body fluids in a patient-care Setting are different than for spills of cultures or other materials in clinical, public health, or research laboratories. In patient-care areas, visible material should first be removed and then the area should be decontaminated. With large spills of cultured or concentrated infectious agents in the laboratory, the contaminated area should be flooded with a liquid germicide before cleaning, then decontaminated with fresh germicidal chemical. In both settings, gloves should be worn during the cleaning and decontaminating procedures.

Laundry

Although soiled linen has been identified as a source of large numbers of certain pathogenic microorganisms, the risk of actual disease transmission is negligible. Rather than rigid procedures and specifications, hygienic and common-sense storage and processing of clean and soiled lined are recommended *(26).* Soiled linen should be handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. All soiled linen should be bagged at the location when it was used; it should not be sorted or rinsed in patient-care areas. Linen soiled with blood or body fluids should be placed and transported in bags that prevent leakage. If hot water is used, linen should be washed with detergent in waler at least 71 C (160 F) for 25 minutes; If low-temperature ($\leq$70 C [158]) laundry cycles are used, chemicals suitable for low-temperature washing at proper use concentration should be used.

Infective Waste

There is no epidemiologic evidence to suggest that most hospital waste is any more infective than residential waste. Moreover, there is no epidemiologic evidence that hospital waste has caused disease in the community as a result of improper disposal. Therefore, identifying wastes for which special precautions are indicated is largely a matter of judgment about the relative risk of disease transmission. The most practical approach to the management of infective waste is 10 identify those wastes with the potential for causing infection during handling and disposal and for which some special precautions appear prudent. Hospital wastes for which special precautions appear prudent include microbiology laboratory waste, pathology waste, and blood specimens or blood products. While any item that has had contact with blood, exudates, or secretions may be potentially infective, it is not usually considered practical or necessary to treat all such waste as infective *(23,26).* Infective waste, in general, should either be incinerated or should be autoclaved before disposal in a sanitary landfill. Bulk blood, suctioned fluids, excretions, and secretions may be carefully poured down a drain connected to a sanitary sewer. Sanitary sewers may also be used to dispose of other infectious wastes capable of being ground and flushed into the sewer.

Implementation of Recommended Precautions

Employers of healthcare workers should ensure that policies exist for:

1. lnitial orientation and continuing education and training of all health-care workers-including students and trainees-on the epidemiology, modes or transmission, and prevention of HIV and other blood-borne infections and the need for routine use of universal blood and body-fluid precautions for all patients.

2. Provision of equipment and supplies necessary to minimize the risk of infection with HIV and other blood-borne pathogens.

3. Monitoring adherence to recommended protective measures. When monitoring reveals a failure to follow recommended precautions, counseling, education, and/or re-training should be provided, and, if necessary, appropriate disciplinary action should be considered.

Professional associations and labor organizations, through continuing education efforts, should emphasize the need for healthcare workers to follow recommended precautions.

Serologic Testing for HIV Infection

Background

A person is identified as infected with HIV when a sequence of teals, starting with repeated enzyme Immunoassays (EIA) and including a Western blot or similar, more specific assay, are repeatedly reactive. Persons infected with HIV usually develop antibody against the virus within 6-12 weeks after infection.

The sensitivity of the currently licensed EL4 tests is at least 99% when they are performed under optimal laboratory conditions on serum specimens from persons infected for ≥12 weeks. Optimal laboratory conditions include the use of reliable reagents, provision of continuing education of personnel, quality control of procedures, and participation in performance -evaluation programs. Given this performance, the probability of a false-negative test is remote except during the first several weeks after infection, before detectable antibody is present. The proportion of infected persons with a false-negative test attributed to absence of antibody in the early stages of infection is dependent on both the incidence and prevalence of HIV infection in a population (Table 1).

Table 1. Estimated annual number of patients infected with HIV not detected by HIV-antibody testing in a hypothetical hospital with 10,000 admissions/year*

Beginning prevalence of HIV lnfection	Annual incidence of HIV infection	Approximate number of HIV-lnfecled patients	Approximate number of HIV-lnfecled patients not detected
5.0%	1.0%	550	17-18
5.0%	0.5%	525	11-12
1.0%	0.2%	110	3-4
1.0%	0.1%	105	2-3
0.1%	0.02%	11	o-1
0.1%	0.01%	11	C-l

*The estimates are based on the following assumptions: 1) the sensitivity of the screening lest is 99% (i.e., 99% of HIV-infected persons with antibody will be. detected); 2) persons infected with HIV will not develop detectable antibody (seroconvert) until 6 weeks (I.5 months) after infection; 3) new infections occur at an equal rate throughout the year; 4) calculations of the number of HIV-infected persons in the patient population are based on the mid-year prevalence, which is the beginning prevalence plus half the annual incidence of infections.

The specificity of the currently licensed EIA tests is approximately 99% when repeatedly reactive tests are considered. Repeat testing of initially reactive specimens by ElA is required to reduce the likelihood of laboratory error. To increase further the specificity of serologic tests, laboratories must use a supplemental lest, most often the Western blot, lo validate repeatedly reactive EIA results. Under

optimal laboratory conditions, the sensitivity of the Western blot test is comparable to or greater than that of a repeatedly reactive EIA, and the Western blot is highly specific when strict criteria are used tO interpret the test results. The testing sequence of a repeatedly reactive EIA and a positive Western blot test is highly predictive of HIV infection, even in a population with a low prevalence of infection (Table 2). If the Western blot test result is Indeterminant, the testing Is considered equivocal for HIV infection. When this occurs, the Western blot test should be repeated on the same serum sample, and, if still indeterminant, the testing sequence should be repeated on a sample collected 3-6 months later. Use of other supplemental tests may aid in interpreting of results on samples that are persistently indeterminant by Western blot.

TABLE 2. Predictive value of positive HlV-antibody tests in hypothetical populations with different prevalences of infection

	Prevalence of infection	Predictive value of positive test*
Repeatedly reactive enzyme immunoassay (EIA)†	0.2%	28.41%
	2.0%	80.16%
	20.0%	98.02%
Repeatedly reactive EIA followed by positive Western blot (WB)‡	0.2%	99.75%
	2.0%	99.97%
	20.0%	99.99%

*Proportion of Persons with positive test results who arc actually infected with HIV.
†Assumes EIA sensitivity of 99.0% and specificity of 99.5%.
‡Assumes WB sensitivity of 99.0% and specificity of 99.9%.

Testing of Patients

Previous CDC recommendations have emphasized the value of HIV serologic testing of patients for: 1) management of parenteral or mucous-membrane exposures of health-care workers, 2) patient diagnosis and management, and 3) counseling and serologic testing to prevent and control HIV transmission in the community. In addition, more recent recommendations have stated that hospitals, in conjunction with state and local health departments, should periodically determine the prevalence of HIV infection among patients from age groups at highest risk of infection *(32).*

Adherence to universal blood and body-fluid precautions recommended for the care of all patients will minimize the risk of transmission of HIV and other blood-borne pathogens from patients to health-care workers. The utility of routine HIV serologic testing of patients as an adjunct to universal precautions is unknown. Results of such testing may not be available in emergency or outpatient settings. In addition, some recently infected patients will not have detectable antibody to HIV (Table 1)

Personnel in some hospitals have advocated serologic testing of Patients in settings in which exposure of health-can workers to large amounts of patients' blood may be anticipated. Specific patients for whom serologic testing has been advocated include those undergoing major operative procedures and those undergoing treatment in critical-care units, especially if they have conditions involving uncontrolled bleeding. Decisions regarding the need to establish testing programs for patients should be made by physicians or individual institutions. In addition, when deemed appropriate, testing of individual patients may be performed on agreement between the patient and the physician providing care.

In addition to the universal precautions recommended for all patients, certain additional precautions for the care of HIV-infected patients undergoing major surgical operations have been proposed by personnel in some hospitals. For example, surgical procedures on an HIV-infected patient might be altered so that hand-to-hand passing of sharp instruments would be eliminated; stapling instruments rather than hand-suturing equipment might be used to perform tissue approximation; electrocautery devices rather than scalpels might be used as cutting instruments; and, even though uncomfortable, gowns that totally prevent seepage of blood onto the skin of members of the operative team might be worn. While such modifications might further minimize the risk of HIV infection for members of the operative team, some of these techniques could result in prolongation of operative time and could potentially have an adverse effect on the patient.

Testing programs, if developed, should include the following principles:

- Obtaining consent for testing.

- Informing patients of test results, and providing counseling for seropositive patients by properly trained persons.
- Assuring that confidentiality safeguards are in place to limit knowledge of test results to those directly involved in the care of infected patients or as required by law.
- Assuring that identification of infected patients will not result in denial of needed care or provision of suboptimal care.
- Evaluating prospectively 1) the efficacy of the program in reducing the incidence of parenteral, mucous-membrane, or significant cutaneous exposures of health-care workers to the blood or other body fluids of HIV-infected patients and 2) the effect of modified procedures on patients.

Testing of Health-Care Workers

Although transmission of HIV from infected healthcare workers to patients has not been reported, transmission during invasive procedures remains a possibility. Transmission of hepatitis B (HBV)--a blood-borne agent with a considerably greater potential for nosocomial spread from health-care workers to patients has been documented. Such transmission has occurred in situations (e.g., oral and gynecologic surgery) in which health-care workers, when tested, had very high concentrations of HBV in their blood (at least 100 million infectious virus particles per milliliter, a concentration much higher than occurs with HIV infection), and the health-care workers sustained a puncture wound while performing invasive procedures or had exudative or weeping lesions or microlacerations that allowed virus to contaminate instruments or open wounds of patients *(33,34).*

The hepatitis B experience indicates that only those health-care workers who perform certain types of invasive procedures have transmitted HBV to patients. Adherence to recommendations in this document will minimize the risk of transmission of HIV and other blood-borne pathogens from health-careworkem to patients during invasive procedures. Since transmission of HIV from infected health-care workers performing invasive procedures to their patients has not been reported and would be expected to occur only very rarely, if at all, the utility of routine resting of such health-care workers lo prevent transmission of HIV cannot be assessed. If consideration is given to developing a serologic testing program for health-care workers who perform invasive procedures, the frequency of testing, as well as the issues of consent, confidentiality, and consequences of test results-as previously outlined for testing programs for patients--must be addressed,

Management of Infected Health-Care Workers

Health-care workers with impaired immune systems resulting from HIV infection or other causes are at increased risk of acquiring or. experiencing serious complications of infectious disease. Of particular concern is the risk of severe infection following exposure to patients with infectious diseases that are easily transmitted if appropriate precautions are not taken (e.g., measles, varicella). Any health-care worker with an impaired immune system should be counseled about the potential risk associated with taking care of patients with any transmissible infection and should continue to follow existing recommendations for infection control to minimize risk of exposure to other infectious agents *(7,35).* Recommendations of the Immunization Practices Advisory Committee (ACIP) and institutional policies concerning requirements for vaccinating healthcare workers with live-virus vaccines (e.g., measles, rubella) should also be considered.

The question of whether workers infected with HIV-especially those who perform invasive procedures -can adequately and safely be allowed to perform patient-care duties or whether their work assignments should be changed must be determined on an individual basis. These decisions should be made by the health-care worker's personal physician(s) in conjunction with the medical direction and personnel health service staff of the employing institution or hospital.

Management of Exposures

If a health-care worker has a parenteral (e.g., needlestick or cut) or a mucous-membrane (e.g., splash to the eye or mouth) exposure to blood or other body fluids or has a cutaneous exposure involving large amounts of blood or prolonged contact with blood --especially) when the exposed skin is chapped, abraded, or afflicted with dermatitis-'the source patient should be informed of the incident and tested for serologic evidence of HIV infection after consent is obtained. Policies should be developed for testing source patients in situations in which consent cannot be obtained (e.g., an unconscious patient).

If the source patient has AIDS, is positive for HIV antibody, or refuses the test, the health-care worker should be counseled regarding the risk of infection and evaluated clinically and serologically for evidence of HIV infection as soon as possible after the exposure. The health-care worker should be advised to report and seek medical evaluation for any acute febrile illness that occurs within 12 weeks after the exposure. Such an illness-particularly one characterized by fever, rash. or lymphadenopathy-may be indicative of recent HIV infection. Seronegative health-care workers should be retested 6 weeks post-exposure and on a periodic basis thereafter (e.g., 12 weeks and 6 months after exposure) to determine whether transmission has occurred. During this follow.up period -especially the first 6-12

weeks after exposure, when most infected persons are expected to seroconvert-exposed health-care workers should follow U.S. Public Health Service (PHS) recommendations for preventing transmission of HIV *(36,37)*.

No further follow-up of a health-care worker exposed to infection as described above is necessary if the source patient is seronegative unless the source patient is at high risk of HIV infection. In the latter case, a subsequent specimen (e.g., 12 weeks following exposure) may be obtained from the health-care worker for antibody testing. If the source patient cannot be identified, decisions regarding appropriate follow-up should be individualized. Serologic testing should be available to all health-care workers who are concerned that they may have been infected with HIV.

If a patient has a parenteral or mucous-membrane exposure to blood or other body fluid of a health-care worker, the patient should be informed of the incident, and the same procedure outlined above for management of exposures should be followed for both the source healthcare worker and the exposed patient.

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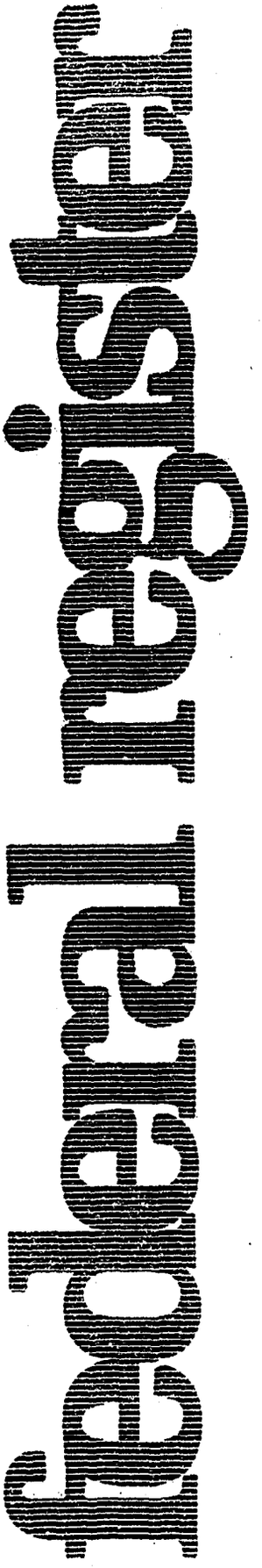
*US GOVERNMENT PRINTING OFFICE 1989

Appendix B-2



Friday
December 6, 1991

Part II

Department of Labor

Occcupational Safety and Health Administration

29 CFR Part 1910.1030

Occupational Exposure to Bloodborne Pathogens; Final Rule

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1910.1030

[Docket No. H-3701

Occupational Exposure to Bloodborne Pathogens

AGENCY: Occupational Safety and Health Administration (OSHA), Labor

ACTION: Final rule.

SUMMARY: The Occupational Safety and Health Adminitration hereby promulgates a standard under section 6(b) of the Occupational Safety and Health Act of 1970 (the Act), 29 U.S.C. 655 to eliminate or minimize occupational exposure to Hepatitis B Virus (HBV), Human Immunodeficiency Virus (HIV) and other bloodborne pathogens. Based on a review of the information in the rulemaking record, OSHA has made a determine that employees face a significant health risk as the result of occupational exposure to blood and other potentially infectious -materials because they may contain bloodborne pathogens, including hepatitis B virus which causes Hepatitis B, a serious liver disease, and human immunodeficiency virus, which causes Acquired Immunodeficiency Syndrome (AIDS). The Agency further concludes that this exposure can be minimized or eliminated using a combination of engineering and work practice controls personal protective clothing and equipment, training, medical surveillance, Hepatitis B vaccination, signs and labels, and other provisions.

DATES: This standard shall become effective on March 6,1992.

Any petitions for review must be filed not later than the 59th day following the-promulgation of the standard. See . Section S(r) of the OSH Act; 29 CFR 1911.18(d) and United Mine Workers of America v. Mine Safety and Health Administration, 900 F.2d 384 (D.C. Cir. 1990).

ADDRESSES: For additional copies of this standard. contact: OSHA Office of Publications: U.S. Department of Labor, room N3101,200 Constitution Ave., NW., Washington. DC 20210, Telephone (202) 523-9667.

For copies of materials in the docket, contact: OSHA Docket Office, Docket No. H-370, room N2625, U.S. Department of Labor, 200 Constitution Ave, NW., Washington, DC 20210, Telephone (202) 523-7894. The hours of operation of the Docket Office are 10 a.m. until 4 p.m.

In compliance with 28 U.S.C. 2112(a). the Agency designates for receipt of petitions for review of the standard, the Associate Solicitor for Occupational Safety and Health, Office of the Solicitor, room S-4004, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210.

FOR FURTHER INFORMATION CONTACT: Mr. James F. Foster, OSHA, U.S. Department of Labor, Office of public Affairs, Room N3647, 200 Constitution Avenue, NW., Washington, DC-20216; telephone (202) 523-8151.

SUPPLEMENTARY INFORMATION:

Table of Contents

References to the rulemaking record are in the, text of the preamble. References are given as "EX." followed by a number to designate the reference in the docket. For example, "Ex. 1" means exhibit 1 in the Docket H-370. This document is a copy of the Advance Notice of Proposed Rulemaking for Bloodborne Pathogens that was published in the Federal Register on November 27, 1987 (52 FR 45438). References to the transcripts of the public hearings are given as "Tr." followed by the date and page. For example, "Mr. Clyde R Bragdon, Jr. Tr. 9/14/89, p. l00" refers to the first page of the testimony of Mr. Clyde A. Bragdon, Jr.; Administrator of the U.S. Fire Administration, given at the public hearing on September 14,1989. A list of the exhibits, copies of the exhibits, and copies of the transcripts are available in the OSHA Docket Office.

I. Introduction

The preamble to the Final Standard for Occupational Exposure to Bloodborne Pathogens discusses the events leading to the promulgation of final standard, health effects of. exposure, degree and significance of the risk, an analysis of the technological and economic feasibility of the standard's implementation, regulatory impact and regulatory flexibility analysis, and the rationale behind the specific provisions of the standard.

The public was invited to comment on these matters following publication of the Advance Notice of proposed Rulemaking on November 27,1987 (52 FR 45436) and following publication of the Proposed Standard on May 30,1989 (54 FR 23042).

The Agency recognizes the unique nature of both the healthcare industry and other operations covered by this standard. The Agency concludes the employee protection can be provided in a manner consistent with a high standard of patient care.

Hazardous, Waste Operations and Emergency Response Standard

The Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard (29 CFR 19l0.120) covers three groups of employees: workers at uncontrolled hazardous waste &mediation sites; workers at Resource Conservation Recovery Act (RCRA) permitted hazardous waste treatment, storage, and disposal facilities; and those workers expected to respond to emergencies caused by the uncontrolled release of hazardous substances.

The definition of hazardous substance includes any biological agent or infectious material which may cause disease or death; There are three potential scenarios where the bloodborne and hazardous waste operations and emergency response standard may interface. These scenarios include: workers involved in cleanup operations at hazardous waste sites involving regulated waste; workers at RCRA permitted incinerators that burn infectious waste; and workers responding to an emergency caused by the uncontrolled release of regulated waste (e.g.; a transportation accident).

Employers of employees engaged in these three activities must comply with the requirements in 29 CFR 1910.120 as well as the Bloodborne Pathogens Standard. If there is a conflict or overlap, the provision that is more protective of employee health and safety applies.

Information Collection Requirements

5 CFR part 1320 sets forth procedures for agencies to follow in obtaining OMB clearance for information collection requirements under the Paperwork Reduction Act of 1980,44 U.S.C. 3501 et seq. The final bloodborne pathogen standard requires the employer to: allow OSHA access to the exposure control plan, medical and training records. In accordance with the provisions of the Paperwork Reduction Act and the regulations issued pursuant thereto, OSHA certifies that it has submitted the information collection to OMB for review under section 3504(h) of that Act.

Public reporting burden for this collection of information is estimated to average five minutes per response to

XI. The Standard

General Industry

Part 1910 of title 29 of the Code of Federal Regulations is amended as follows:

PART 1910--[AMENDED]

Subpart Z--[Amended]

1. The general authority citation for subpart Z of 29 CFR part 1910 continues to read as follows and and a new citation for § 1910.1030 is added

Authority Secs. 6 and 8,Occupational Safety and Health Act,29 U.S.C.: 655,657 Secretary of Labor's Orders Nos. 12-71 (36 FR 8754),8-76 (41 FR 25059), or 9-83 (48 FR. 35736). as applicable; and 29 CFR part 1911.

* * * * *

Section 1910-1030 also issued under 29 U.S.C. 653.

2. Section 1910.1030 is added to read as follows:

§ 1910.1030 Bloodborne Pathogens.

(a) *Scope and AppIication.* This section applies to all occupational exposure to blood or other potentially infectious materials as defined by paragraph (b) of this section.

(b) Definitions. For purposes of this section, the following shall apply:

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, or' designated representative.

Blood means human blood, human blood components, and products made from human Mood.

Bloodborne Pathogens means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to hepatitis B virus (HBV) and human immunodeficiency virus (HIV).'

Clinical Laboratory means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

Contaminated means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item 6, surface.

Contaminated Laundry means laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.

Contaminated Sharps means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires,

Decontamination means the use of. physical or chemical means to remove, inactivate. or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of: Health and Human Services, or designated-representative.

Engineering Controls means controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

Exposure Incident means a specific eye, mouth; other mucous membrane, non-intact skin; or parenteral contact with blood or other potentially infectious materials that result8 from the performance of an employee's duties.

Handwashing Facilities means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.

Licensed Healthcare Professional is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by-paragraph (f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.

HBV means hepatitis B virus,

HIV means human immunodeficiency virus.

Occupational Exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Other Potentially Infectious Materials means

(1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids:

(2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead): and

(3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions: and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Parenteral means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

Personal Protective Equipment is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes [e.g.. uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Production Facility means a facility engaged in industrial-scale large. volume or high concentration production of HIV or HBV.

Regulated Waste means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are(capable of releasing these materials during handling; contaminated sharps: and pathological and microbiological wastes containing blood or other potentially infectious materials.

Research Laboratory means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV.Research laboratories may. produce high concentrations of HIV or HBV but not in the volume found in production facilities.

Source Individual means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims: clients of drug. and alcohol treatment facilities; residents of hospices and nursing homes: human remains; and individuals who donate or sell blood-or blood components.

Sterilize means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

Universal Precautions is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Work Practice Controls means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

(c) *Exposure control-(l) Exposure Control plan.* (i) Each employer having an employee(s) with occupational exposure as defined-by paragraph (b) of this section shall establish a written Exposure Control Plan designed to

eliminate or minimize employee exposure.

(ii) The Exposure Control Plan shall contain at least the following elements:

[A) The exposure determination required by paragraph(c)(2),

(B) The schedule and method of implementation for paragraphs (d) Methods of Compliance, (e) HIV and HBV Research Laboratories and Production Facilities, (f) Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up, (g) Communication of Hazards to Employees, and (h) RecordKeeping, of this standard, and

(C) The procedure for the evaluation of circumstances surrounding exposure incidents as required by paragraph (f)(3)(i) of this standard ._

(iii] Each employer shall ensure that a copy of the Exposure Control Plan is accessible to employees in accordance with 29 CFR 1910.20(e).

(iv) The Exposure Control Plan shall be reviewed and updated at least annually and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure.

(v) The Exposure Control Plan shall be made available to the Assistant Secretary and the Director upon request for examination and coping.

(2) *Exposure determination.* (i) Each employer who has an employee(s) with occupational exposure as defined by paragraph (b) of this section shall prepare an exposure determination. This exposure determination shall contain the following:

(A) A list of all job classifications in which all employees in those job classifications have occupational exposure;

(B) A list of job classifacations in which some employees have occupational exposure, and

(C) A list of all tasks and procedures or groups of closely related task and procedures in which occupational exposure occurs and that are performed by employees in job classifications listed in accordance with the provisions of paragraph (c)(2)(i)(B) of this standard.

(ii) This exposure determination shall be made without regard to the use of personal protective equipment.

(d) Methods of compliance--(1) General --Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

(2) Engineering and work practice controls. (i) Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be used.

(ii) Engineering controls shall be examined and maintained or replaced on a regular schedule to ensure their effectiveness.

(iii) Employers shall provide handwashing facilities (which are readily accessible to employees.

(iv) When provision of handwashing facilities is not feasible; the employer shall provide either an appropriate antiseptic hand cleanser in conjunction with cloth/paper towels or antiseptic towelettes. Whenantiseptic hand cleansers or towelettes are used hands shall be washed with soap and running water as soon as feasible.

(v) Employers shall ensure that employees wash their hands immediately or as soon as feasible after removal of gloves or other personal protective. equipment..

(vi) Employers shall ensure that employees wash hands and any other skin with soap and water, or flush mucous membranes with water immediately or as soon as feasible following contact of such body areas with blood or other potentially infectious materials.

(vii) Contaminated needles and other contaminated sharps shall not be bent,. recapped or removed except as noted in paragraphs (d)(2)(vii)(A) and (d)(2)(vii)(B) below. Shearing or breaking of contaminated needles is prohibited..

(A) Contaminated needles and other contaminated sharps shall not be recapped or removed unless the employer can demonstrate that no alternative is feasible or that such action is required by specific medical procedure.

(8) Such recapping or needle removal must be accomplished through the use of a mechanical device or a one-handed technique.

(viii) Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed. These containers shall be:

(A) Puncture resistant;

(B) Labeled or color-coded in accordance with this standard;

(C) Leakproof on the sides and bottom: and

(D) In accordance with the requirements set forth in paragraph (d)(4)(ii)(E) for reusable sharps.

(ix) Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.

(x) Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets or on countertops-or benchtops where blood or other potentially infectious materials are present.

(xi) All procedures involving blood or other potentially infectious materials shall be performed in such manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.

(xii) Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

(xiii) Specimens of blood or other potentially infectious materiels shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport or shipping.

(A) The container for storage, transport, or shipping shall be labeled or color-coded according to paragraph (g)(1)(i) and closed prior to being stored, transported, or shipped: When a facility utilizes Universal Precautions in the handling of all specimens, the labeling/ color-coding of specimens is not necessary provided containers are recognizable as containing specimens. This exemption only applies while such specimens/container remain within the facility. Labeling or color-coding in:, accordance with paragraph (g)(1)(i) is required when such specimens/ containers leave the facility.

(B) If outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during handling, processing storage, transport, or shipping and is labeled or color-coded according to the requirements of this standard.

(C) If the specimen could puncture the primary container, the primary container shall be placed within a secondary container which is puncture-resistant in addition to the above characteristics.

(xiv) Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible.

(A) A readily observable label in accordance with paragraph (g)(1)(i)(H) shall be attached to the equipment stating which portions remain contaminated.

(B) The employer shall ensure that this information is conveyed to all affected employees, the servicing representative, and/or the manufacturer, as appropriate, prior to handling, servicing, or shipping so that appropriate precautions will-be taken.

(3) Personal protective equipment--(i) Provision. When there is occupational* exposure, the employer shall provide, at no cost to the employee, appropriate, personal protective equipment such as: but not limited to gloves, gowns, laboratory coats; face shields or masks, and eye protection and mouthpieces, resuscitation bags, pocket masks, or other ventilation devices. Personal protective equipment will be considered "appropriate" only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's workclothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use arid for the duration of time which the protective equipment will he used.

(ii) Use. The employer shall ensure that the employee uses appropriate personal protective equipment unless the employer shows that the employee temporarily and briefly declined to use personal protective equipment when, under rare and extraordinary circumstances, it was the employee's professional judgment that in the specific instance its use would have prevented the delivery of health care or. public safety services or would have posed an increased hazard to the safety. of the worker or co-worker.When the employee makes this judgment, the circumstances shall be investigated and' documented in order to determine whether changes can be instituted to prevent such occurences in the future.

(iii) Accessibility. The employer shall ensure that appropriate personal protective equipment in the appropriate -sizes is readily accessible at the worksite or is issued to employees. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.

(iv) Cleaning, Laundering, and Disposal. The employer shall clean, launder, and dispose of personal protective equipment required by paragraphs (d) and (e) of this standard, at no cost to the employee.

(v) Repair and Replacement. The employer shall repair or replace personal protective equipment as needed to maintain its effectiveness, at no cost to the employee.

(vi) If a garment(s) is penetrated by blood or other potentially infectious materials, the garment(s) shall be removed immediately or as soon as feasible.

(vii) All personal protective equipment shall be removed prior to leaving the work area..

(viii) When personal protective equipment is removed it shall be placed in an appropriately designated area or container for storage, washing, decontamination or disposal..,.

(ix) Gloves. Gloves shall be when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin; when. performing vascular access Procedures except as specified in paragraph (d)(3)(ix)(D); and when handling or touching contaminated items or surfaces.

(A) Disposable (single use) gloves such as, surgical or examination gloves, shall be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

(B) Disposable (single use) gloves shall not be washed or decontaminated for re-use.

(C) Utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. However, they must be discarded if they are cracked,peeling, torn, punctured, or exhibit other signs of deterioration or when their ability to function as a barrier is compromised.'

(D) If an employer in a volunteer blood donation center judges that routine gloving for all phlebotomies is not necessary then the employer shall:

(1) Periodically reevaluate this policy;.

(2) Make gloves available to all employees who wish to use them for phlebotomy;

(3) Not discourage the use of gloves for phlebotomy; and

(4) Require that gloves be used for phlebotomy in the following circumstances:

(i) When the employee has cuts, scratches, or other breaks in his or her skin:

(ii) When the employee judges that hand contamination with blood may occur, for example, when performing phlebotomy on an uncooperative source individual: and

(iii) When the employee is receiving training in phlebotomy;

(x) Masks, Eye Protection, and Face Shields. Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.

(xi) Gowns, Aprons, and Other Protective Body Clothing. Appropriate protective clothing such as, but not limited to, gowns, aprons, lab coats, clinic jackets, or similar 'outer garments shall be worn in occupational exposure situations. The type and characteristics will depend upon the task and degree of exposure anticipated.

(xii) Surgical caps or hoods and/or shoe covers or boots shall be worn in instances when gross contamination can reasonably be anticipated (e.g., autopsies, orthopaedic surgery).

(4) *Housekeeping.* (i) General. Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer shall determine and implement an appropriate written schedule for cleaning and method 'of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area...

(ii) All equipment and environmental and working surfaces shall be cleaned and decontaminated after contact with blood or other potentially infectious materials.

(A) Contaminated work surfaces shall be decontaminated with an appropriate disinfectant after completion of procedures: immediately or as soon as feasible when surfaces are overtly contaminated or after any spill of blood or other potentially infectious materials; and at the end of the work shift if the surface may have become contaminated since the last cleaning..

(B) Protective coverings, such as plastic wrap, aluminum foil, or imperviously-backed absorbent paper. used to cover equipment and environmental surfaces, shall be. removed and replaced as soon as feasible when they become overtly contaminated or at the end of the workshift if they may have become contaminated during the shift.

(C) All bins, pails, cans, and similar receptacles intended for reuse which have a reasonable likelihood for becoming contaminated with blood or other potentially infectious materials shall be inspected and decontaminated on-a regularly scheduled basis and cleaned and decontaminated immediately or as soon as feasible upon visible contamination.

(D) Broken glassware which may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means,

such as a brush and dust pan. tongs, or forceps.

(E) Reusable sharps that are contaminated with blood or other potentially infectious materials shall not be stored or processed in a manner that requires employees to reach by hand into the containers where these'sharps have been placed.

(iii) Regulated, Waste.

(A) Contaminated Sharps Discarding and Containment. (1) Contaminated. sharps shall be discarded immediately, or as soon as feasible in containers that are:

(i) Closable;

(ii) Puncture resistant

(iii) Leakproof on sides and bottom; and

(iv) Labeled or color-coded in accordance with paragraph (g)(1)(i) of this standard.

(2) During use, containers for contaminated sharps shall be:

(i) Easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used or can be reasonablyanticipated to be found (e.g., laundries);

[ii] Maintained.-upright throughout use; and

(iii) Replaced routinely and not be allowed to overfill.

(3) When moving containers of contaminated sharps from the area of use, the containers shall be:

(i) Closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping:

(ii) Placed in a secondary container if leakage is possible. The second container shall be:

(A) Closable:

(B) Constructed to contain all contents and prevent leakage during handling. storage, transport, or shipping; and

(C) Labeled or color-coded according to paragraph (g)(1)(i) of this standard.

(4) Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose employees to the risk of percutaneous injury.

(B) Other Regulated Waste Containment. (1) Regulated waste shall be placed in containers which are:

(i) Closable;

(ii) Constructed to contain all contents and prevent leakage of fluids during handling. storage, transport or shipping:

(iii) Labeled or color-coded in accordance with paragraph (g)(1)(i) this standard; and

(iv) Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

(2) If outside contamination of the regulated waste container occurs. it shall be placed in a second container. The second container shall be:

(i) Closable;

(ii) Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport or shipping:

(iii) Labeled or color-coded in, accordance with paragraph (g)(1)(i) of this standard; and

(iv) Closed prior to removal to prevent spillage or protrusion of contents during' handling, storage, transport, or Shipping.

(C) Disposal of all regulated waste shall be in accordance with applicable regulations of the United States, States and Territories, and political subdivisions of States and Territories

(iv) Laundry.

(A) Contaminated laundry shall be handled as little as possible with a minimum of agitation. (1) Contaminated laundry shall be bagged orcontainerized at the location where it 'was used and shall not be sorted or rinsed in the location of use.

(2) Contaminated laundry shall be placed and transported in bags or containerslabeled or color-coded in accordance with paragraph (g)(1)(i) of This standard. When a facility utilizes Universal Precautions in the handling of all soiled laundry, alternative labeling or color-coding is sufficient if it permits all employees to recognize the containers as requiring compliance with Universal Precautions.

(3) Whenever contaminated laundry is wet and presents a reasonable likelihood of soak-through of or leakage from the bag or container, the laundry shall be placed and transported in bags or containers which prevent soak-through and/or leakage of fluids to the exterior.

(B) The employer shall ensure that employees who have contact with contaminated laundry wear protective gloves and other appropriate personal protective equipment.

(C) When a facility ships contaminated laundry off-site to a second facility which does not utilize Universal Precautions in the handling of all laundry, the facility generating the contaminated laundry must place such laundry in bags or containers which are labeled or color-coded in accordance with paragraph (g)(1)(i).

(e) HIV and HBV Research Laboratories and Production Facilities. (1) This paragraph applies to research laboratories and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HSV. It does not apply to clinical or diagnostic laboratories engaged solely in the analvsis of blood, tissues. or organs. These requirements apply in addition to the other requirements of the standard.

(2) Research laboratories and production facilities shall meet the following criteria:

(i) Standard microbiological practices. All regulated waste shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens;

(ii) Special practices.

(A) Laboratory doors shall be kept closed when work involving HIV or HBV is in progress.

(B) Contaminated materials that are to be decontaminated at site away from the work area shall be placed in a durable, leakproof, labeled or color-coded container that is closed before being removed from the work area.

(C) Access to the work area shall be limited to authorized persons. Written policies and procedures shall be established whereby only persons who have been advised of the potential biohazard, who meet any specific entry requirements, and who comply with all entry and exit procedures shall be allowed to enter the work areas and animal rooms.

(D) When other potentially infectious materials or infected animals are present in the work area or containment module, a hazard warning sign incorporating the universal biohazard symbol shall be posted on all access doors. The hazard warning sign shall comply with paragraph (g)(1)(ii) of this standard.

(E) All activities involving other potentially infectious materials shall be conducted in biological safety cabinets or other physical-containment devices within the containment module. No work with these other potentially infectious materials shall be' conducted on the open bench.

(F) Laboratory coats, gowns smocks, uniforms, or other appropriate protective clothing shall be used in the work area and animal rooms. Protective clothing shall not be worn outside of the work area and shall be decontaminated before being laundered.

(G) Special care shall be taken to avoid skin contact with other potentially infectious materials. Gloves shall be worn when handling infected animals and when making hand contact with other potentially infectious materials is unavoidable.

(H) Before disposal all waste from work areas and from animal rooms shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens

(I) Vacuum lines shall be protected with liquid disinfectant traps and high-efficiency particulate air (HEPA) filters or filters of equivalent or superior efficiency and which are checked routinely and maintained or replaced as necessary.

(J) Hypodermic needles and syringes shall be used only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles. Only needle locking syringes or disposable syringe-needle units (i.e., the needle is integral to the syringe) shall be used for the injection or aspiration of other potentially infectious materials. Extreme caution shall be used when handling needles and syringes. A needle shall not he bent, sheared, replaced in the sheath or guard or removed from the syringe following use. The needle and syringe shall be promptly placed in a puncture-resistant container and autoclaved or decontaminated before reuse or disposal.

(K) All spills shall be immediately contained and cleaned up by appropriate professional staff or others properly trained and equipped to work with potentially concentrated infectious materials.

(L) A spill or accident that results in an exposure incident shall be immediately reported to the laboratory director or other responsible person.

(M) A biosafety manual shall be prepared or adopted and periodically reviewed and updated at least annually or more often if necessary. Personnel shall be advised of potential hazards, shall be required to read instructions on practice8 and procedures, and shall be required to follow them.

(iii) Containment equipment. (A) Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing respirators, centrifuge safety cups, sealed centrifuge rotors, and containment caging for, animals, shall be used for all activities with other potentially infectious materials that pose a threat of exposure to droplets, splashes, spills, or aerosols.

(B) Biological safety cabinets shall be certified when installed, whenever they are moved and at least annually.

(3) HIV and HBV research laboratories shall meet the following criteria:

(i) Each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area.

(ii) An autoclave for decontamination of regulated waste shall be available.

(4) HIV and HBV production facilities shall meet the following criteria:

(i) The work areas shall be separated from areas that are open to unrestricted traffic flow within the building. Passage through two sets of doors shall be the basic requirement for entry into the work area from access corridors or other contiguous areas. Physical separation of the high-containment work area from access corridors Or other areas or activities may also be provided by a double-doored clothes-change room (showers may be included), airlock. or other access facility that requires passing through two sets of doors before entering the work area.

(ii) The surfaces of doors, walls, floors and ceilings in the Work area shall be water resistant so that they can be easily cleaned. Penetrations in these surfaces shall be sealed *or* capable of being sealed to facilitate decontamination.

(iii) Each work area shall contain a sink for washing hands and a readily available eye wash facility. The sink shall he foot, elbow, or automatically operated and shall be located near the exit door of the work area.

(iv) Access doors to the work area or containment module shall be self-closing.

(v) An autoclave for decontamination of regulated waste shall be available within or as near as possible to the work area.

(vi) A ducted exhaust-air ventilation system shall be provided. This system shall create directional airflow that draws air into the work area through the entry area. The exhaust air shall not be recirculated to any other area of the building, shall be discharged to the outside, and shall be dispersed away from occupied areas and air intakes. The proper direction of the airflow shall be verified (i.e., into the work area).

(5) *Training Requirement. Additional* training requirements for employees in HIV and HBV research laboratories and HIV and HBV production facilities are specified in paragraph (g)(2)(ix).

(f) *Hepatitis B vaccination and post-exposure evaluation and follow-up--(1)* General. (i) The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-, exposure evaluation and follow-up to all employees who have had an exposure incident.

(ii) The employer shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis. are:

(A) Made available at no cost to the employee:

(B) Made available to the employee at a reasonable time and place;

(C) Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional; and

(D) Provided according to recommendations of the U.S. Public Health Service current at the time. these evaluations and procedures take place, except a8 specified by this paragraph (f).

(iii) The employer shall ensure that all laboratory tests are conducted by an accredited laboratory at no cost to the employee.

(2) *Hepatitis B Vaccination:* (i) Hepatitis B vaccination shall be made available after. the employee has received the training required in paragraph (g)(2)(vii)(I) and within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(ii) The employer shall not make participation in a prescreening program a prerequisite for receiving hepatitis B vaccination

(iii) If the employee initially declines hepatitis B vaccination but at a later date while still covered under the standard decides to accept the vaccination, the employer shall make available hepatitis B vaccination at that time.

(iv) The employer shall assure that employees who decline to accept hepatitis B vaccination offered by the employer sign the statement in appendix A.

(v) If a routine booster dose(s) of hepatitis B vaccine is recommended by the U.S. public Health Service at a future date, such booster dose(s) shall. be made available in accordance with section (f)(1)(ii).

(3) *Post-exposure Evaluation and Follow-up.* Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up. including at least the following elements:

(i) Documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred;

(ii) Identification and documentation of the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law;

(A) The source individual's blood shall be tested as soon as feasible and

after consent is obtained in order to determine HBV and HIV infectivity. If consent is not obtained, the employer shall establish that legally required consent cannot be obtained. When the source individual's consent is not required by law, the source individual's blood if available, shall be tested and the results documented.

(B) When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status need not be repeated.

(C) Results of the source individual's testing shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

(iii) Collection and testing of blood for HBV and HIV serological status;

(A) The exposed enployee's blood shall be collected as soon as feasible 'and tested after consent 'is obtained.

(B) If the employee consents to baseline blood collection, but does not give consent at that timefor HIV serologic testing, the sample shall be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee elects to have the baseline sample tested; such testing shall be done as soon as feasible.

(iv) Post-exposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service:

(v) Counseling; and

(vi) Evaluation of reported illnesses.

(4) *Information Provided to the Health Professional.* (i) The employer shall ensure that the healthcare professional responsible for the employee's Hepatitis B vaccination is provided a copy of this regulation.

(ii) The employer shall ensure that the healthcare professional evaluating an employee after an exposure incident is provided the following information:

(A) A copy of this regulation;

(B) A description of the exposed employee's duties as they relate to the exposure incident;

(C) Documentation of the route(s) of exposure and circumstances under which exposure occurred;

(D) Results of the source individual's blood testing if available: and

(E) All medical records relevant to the appropriate treatment of the employee including vaccination status which are the employer's responsibility to maintain.

(5) *Healthcare Professional's Written Opinion.* The employer shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

(i) The healthcare professional's written opinion for Hepatitis B vaccination shall be limited to whether Hepatitis B vaccination k-indicated for an employee, and if the employee has received such vaccination.

(ii) The healthcare professional's written opinion for post-exposure evaluation and follow-up shall be limited to the following information:

(A) that the employee has been informed of the results of the evaluations; and

(B) That the employee has been told about any medical conditions resulting from exposure to blood or, other potentially infectious materials which require further evaluation or treatment

(iii) All other findings or diagnoses shall remain confidential and shall not be included in the written report

(6). *Medical recordkeeping. Medical* records required by this standard shall be maintained in accordance with paragraph(h)(l) of this section

(g) *Communication of hazards to employees* -- (1) *Labels and signs.* (i) Labels. (A). Warning Iabels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials, except as provided in paragraph (g)(l)(i)(E), (F) and (G) .

(B) Labels required by section shall include the following legend:

BIOHAZARD

BIOHAZZARD

(C) These labels shall be fluorescent orange or orange-red or predominantly so, with lettering or symbols in a contrasting color.

(D) Labels required by affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

(E) Red bags or red containers may be substituted for labels.

(F) Containers of blood, blood components, or blood products that are labeled as to their contents and have been released for transfusion or other clinical. use are exempted from the labeling requirements of paragraph (g).

(G) Individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment or disposal are exempted from the labeling requirement.

(H) Labels required for contaminated equipment shall be in accordance with this paragraph and shall also state which portions of the equipment remain contaminated.

(I) Regulated waste that has been decontaminated need not be labeled or color-coded

(ii) Signs. [A] The Employer shall post signs at the entrance to work areas specified in paragraph (e), HIV and HBV Research Laboratory and Production Facilities, which shall bear the following legend:

BIOHAZARD

BIOHAZARD

(Name of the Infections Agent)
(Special requirements for entering the area)
(Name, telephone number of the laboratory director or other responsible person.)

(B) These signs shall be fluorescent orange-red or predominantly so, with lettering or symbols in a contrasting color.

(2) Information and Training. (i) Employers shall ensure that all employees, with occupational exposure participate in a training program which must be provided at no cost to the employee and during working hours.

(ii) Training shall be provided as follows:

(A) At the time of initial assignment to tasks where occupational exposure may take place;

(B) Within 90 days after the effective date of the standard; and

(C) At least annually thereafter.

(iii) For employees who have received training on bloodborne pathogens in the year preceding the effective date, of the standard, only training with respect to the provisions of the standard which were not included need be provided,

(iv) Annual training for all employees shall be provided within one year of their previous training,

(v) Employers shall provide additional training when changes such as. modification of tasks or procedures or institution of new tasks or procedures affect the employee's occupational exposure. The additional training may be limited to addressing the new exposures created.

(vi) Material appropriate in content and vocabulary to educational level, literacy, and language of employees shall be used.

(vii) The training program shall contain at a minimum the following elements:

(A) An accessible copy of the regulatory text of this standard and an explanation of its contents;

(B) A general explanation of the epidemiology and symptoms of bloodborne diseases;

(C) An explanation of the modes of transmission of bloodborne pathogens:

(D) An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan;

(E) An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials:

(F) An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment:

(G) Information on the types; proper' use, location, removal, handling, decontamination and disposal of personal protective equipment;

(H) An explanation of the basis for selection of personal protective equipment:

(I) Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge:

(J) Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials:

(K) An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available:

(L) Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident;

(M) An explanation of the signs and labels and/or color coding required by paragraph (g)(1); and

(N) An opportunity for interactive questions and answers with the person conducting the training session.

(viii) The person conducting the training shall be knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the workplace that the training will address.

(ix) Additional Initial Training for Employees in HIV and HBV Laboratories and Production Facilities. Employees in HIV or HBV research laboratories and HIV or HBV production facilities shall receive the following initial training in addition to the above training requirements.

(A) The employer shall assure that employees demonstrate proficiency in standard microbiological practices and techniques and in the practices and operations specific to the facility before being allowed to work with HIV or HBV.

(B) The employer shall assure that employees have prior experience in the handling of human pathogens or tissue cultures before working with HIV or HBV.

(C) The employer shall provide a training program to employees who have no prior 'experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents. A progression of work activities shall be assigned as techniques are learned and proficiency is developed. The employer shall assure that employees participate in work activities involving infectious agents only after proficiency has been demonstrated.

(h) *Recordkeeping- Medical Records.* (i) The employer shall establish and maintain an accurate record for each employee with occupational exposure, in accordance with 29 CFR 1910.20.

(ii) This record shall include:

(A) The name and social security number of the employee:

(B) A copy of the employee's hepatitis B vaccination status including the dates of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination as required by paragraph (f)(2);

(C) A copy of all results of examinations, medical testing, and follow-up procedures as required by paragraph (f)(3);

(D) The employer's copy of the healthcare professional's written opinion as required by paragraph (f)(5):

(E) A copy of the information provided to the healthcare professional as required by paragraphs (f)(4)(ii)(B)(C)

(iii) Confidentiality. The employer shall ensure that employee medical records required by paragraph (h)(1) are*

(A) Kept confidential; and

(B) Are not disclosed or reported without the employee's express written consent to any person within or outside the workplace except as required by this section or as may be required by law.

(iv) The employer shall maintain the records required by paragraph (h) for at least the duration of employment plus 30 years in accordance with 29 CFR 19l0.20.

(2) *Training Records. (i) Training records shall include the following information:*

(A) The dates of the training sessions:

(B) The contents or a summary of the training session;

(C) The names and qualifications of persons conducting the training: and

(D) The names and job titles of all persons attending the training sessions.

(ii) Training records shall be maintained for 3 years from the date on which the training occurred.

(3) *Availability.* (i) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director for examination and copying.

(ii) Employee training records required by this paragraph shall be provided upon request for examination and copying to employees, to employee representatives, to the Director, and to the Assistant Secretary in accordance with 29 CFR 1910.20.

(iii) Employee medical records required by this paragraph shall be provided upon request for examination and copying to the subject employee, to anyone having written consent of the subject employee, to the Director, and to the Assistant Secretary in accordance with 29 CFR 1910.20.

(4) *Transfer of Records.* (i) The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.20(h).

(ii) if the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the Director, at least three months prior to their disposal and transmit them to the Director, if required by the Director to do so, within that three month period.

(i) *Dates--(1) Effective Date.* The standard shall become effective on March 6, 1992.

(2) The Exposure Control Plan required by paragraph (c)(2) of this section shall be completed on or before May 5, 1992.

(3) Paragraph (g)(2) Information and Training and (h) Recordkeeping shall take effect on or before June 4, l992.

(4) Paragraphs (d)(2) Engineering and Work Practice Controls,(d)(3) Personal Protective Equipment,: (d)(4). Housekeeping. (e) HIV and HBV Research Laboratories and Production Facilities, (f) Hepatitis Vaccination and Post-Exposure Evaluation and Follow-up, and (g) (1) Labels and Signs, shall take effect July 6, 1992.

Appendix A to Section 1910.1030--Hepatilis B Vaccine Declination (Mandatory)

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of: acquiring hepatitis B virus [HBV] infection; I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself, However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupationa! exposure to blood or other potential infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

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Appendix B-3

Subtitle B-Emergency Response Employees

SEC. 411 ESTABLISHMENT OF PROGRAM.

(a) IN GENERAL. --Title XXVI of the Public Health Service Act (as amended by section 401) is further amended by adding at the end the following new part:

"PART E-EMERGENCY RESPONSE EMPLOYEES

SUBPART I-GUIDELINES AND MODEL CURRICULUM

42 USC 300ff-80. "SEC.2680.GRANTS FOR IMPLEMENTATION.

"(a) IN GENERAL-with respect to the recommendations contained in the guidelines and the model curriculum developed under section 253 of Public Law 100-607, the Secretary shall make grants to States and political subdivisions of States for the purpose of assisting grantees regarding the initial implementation of such portions of the recommendations as are applicable to emergency response employees.

"(b) REQUIREMENT OF APPLICATION.—The Secretary may not make a grant under subsection (a) unless an application for the grant is submitted to the Secretary and the application is in such form, is made in such manner, and contains such agreements, assurances, and information as the Secretary determines to be necessary to carry out this section.

"(c) AUTHORIZATION OF APPROPRIATIONS.—For the purpose of carrying out this section, there is authorized to be appropriated $5,000,000 for each of the fiscal years 1991 through 1995.

"SUBPART—NOTIFICATIONS OF POSSIBLE EXPOSURE TO INFECTIOUS DISEASES

"SEC. 2681. INFECTIOUS DISEASES AND CIRCUMSTANCES RELEVANT TO NOTIFICATIONREQUIREMENTS. 42.USC 300ff-81.

"(a) IN GENERAL-Not later than 180 days after the date of the enactment of the Ryan White Comprehensive AIDS Resources agency Act of 1990, the Secretary shall complete the develop

"(1) a list of potentially life-threatening infectious diseases to which emergency response employees may be exposed in responding to emergencies;

"(2) guidelines describing the circumstances in which such employees may be exposed to such diseases, taking into account the conditions under which emergency response is provided; and

"(3) guidelines describing the manner in which medical facilities should make determinations for purposes of section 2683(d).

"(b) SPECIFICATION OF AIRBORNE INFECTIOUS DISEASES.-The list developed by the Secretary under subsection (a)(l) shall include a specification of those infectious diseases on the list that are routinely transmitted through airborne or aerosolized means.

"(c) DISSEMINATION.-The secretary shall-

"(1) transmit to State public health officers copies of the list and guidelines developed by the Secretary under subsection (a) with the request that the officers disseminate such copies as appropriate throughout the States; and

"(2) make such copies available to the public.

Public information.
42 USC 300ff-82.

"SEC. 2682, ROUTINE NOTIFICATIONS WITH RESPECT TO AIRBORNE INFECTIOUS DISEASES IN VICTIMS ASSISTED.

"(a) ROUTINE NOTIFICATION OF DESIGNATED OFFICER.—

"(1) DETERMINATION BY TREATING FACILITY.—If a victim of an emergency is transported by emergency response employees to a medical facility and the medical facility makes a determination that the victim has an airborne infectious disease, the medical facility shall notify the designated officer of the emergency response employees who transported the victim to the medical facility of the determination.

"(2) DETERMINATION BY FACILITY ASCERTAINING CAUSE OF DEATH.— a victim of an emergency is transported by emergency response employees to a medical facility and the victim dies at or before reaching the medical facility, the medical facility ascertaining the cause of death shall notify the deaignated officer of the emergency response employees who transported the victim to the initial medical facility of any determination by the medical facility that the victim had an airborne infectious disease.

"(b) REQUIREMENT OF PROMPT NOTIFICATION.—With respect to a determination described in paragraph (1) or (2), the notification required in each of such paragraphs shall be made as soon as is practicable, but not later than 48 hours after the determination is made.

42 USC 300ff-83.

"SEC. 2683. REQUEST FOR NOTIFICATION WITH RESPECT TO VICTIMS ASSISTED.

"(a) INITIATION OF PROCESS BY EMPLOYEE.-If an emergency response employee believes that the employee may have been exposed to an infectious disease by a victim of an emergency who was transported to a medical facility as a result of the emergency, and if the employee attended,. treated, assisted, or transported the victim pursuant to the emergency, then the designated officer of the employee shall, upon the request of the employee, carry out the duties described in subsection (b) regarding a determination of whether the employee may have been exposed to an infectious disease by the victim.

"(b) INITIAL DETERMINATION BY DESIGNATED OFFICER.-The duties referred to in subsection (a) are that-

"(1) the designated officer involved collect the facts relating to the circumstances under which, for purposes of subsection (a), the employee involved may have been exposed to an infectious disease; and

"(2) the designated officer evaluate such facts and make a determination of whether, if the victim involved had any infectious disease included on the list issued under paragraph (1) of section 2681(a), the employee would have been exposed to the disease under such facts, as indicated by the guidelines issued under paragraph (2) of such section.

"(c) SUBMISSION OF REQUEST TO MEDICAL FACILITY.-

"(1) IN GENERAL.-If a designated officer makes a determination under subsection (b)(2) that an emergency response employee may have been exposed to an infectious disease, the designated officer shall submit to the medical facility to which the victim involved was transported a request for a response under subsection (d) regarding the victim of the emergency involved.

"(2) FORM OF REQUEST.-A request under paragraph (1) shall be in writing and be signed by the designated officer involved, and shall contain a statement of the facts collected -pursuant to subsection (b)(l).

"(d) EVALUATION AND RESPONSE REGARDING REQUEST TO MEDICAL FACILITY.-

"(1) IN GENERAL.-If a medical facility receives a request under subsection (c), the medical facility shall evaluate the facts submitted in the request and make a determination of whether, on the basis of the medical information possessed by the facility regarding the victim involved, the emergency response employee was exposed to an infectious disease included on the list issued under paragraph (1) of section 2681(a), as indicated by the guidelines issued under paragraph (2) of such section.

"(2) NOTIFICATION OF EXPOSURE.-+ a medical facility makes a determination under paragraph (1) that the emergency response employee involved has been exposed to an infectious disease, the medical facility shall, in writing, notify the designated officer who submitted the request under subsection (c) of the determination.

"(3) FINDING OF. NO EXPOSURE.-If a medical facility makes a determination under paragraph (10 that the emergency response employee involved has not been exposed to an infectious disease, the medical facility shall, in writing, inform the designated officer who submitted the request under subsection (c) of the determination.

"(4) INSUFFICIENT INFORMATION.-

"(A) If a medical facility finds in evaluating facts for purposes of paragraph (1) that the facts are insufficient to make the determination described in such paragraph, the medical facility shall, in writing, inform the designated officer who submitted the request under subsection (c) of the insufficiency of the facts.

"(B)(i) If a medical facility finds in making a determination under paragraph (1) that the facility possesses no information on whether the victim involved has an infectious disease included on the list under section 2681(a), the medical facility, shall, in writing, inform the designated officer who submitted the request under subsection (c) of the insufficiency of such medical information.

"(ii) If after making a response under clause (i) a medical facility determines that the victim involved has an infectious disease, the medical facility shall make the determination described in paragraph (1) and provide the applicable response specified in this subsection.

"(e) TIME FOR MAKING RESPONSE.-After receiving a request under subsection (c) (including any such request resubmitted under subsection (p)(2)), a medical facility shall make the applicable response specified in subsection (d) as soon as is practicable, but not later than 48 hours after receiving the request.

"(f) DEATH OF VICTIM OF EMERGENCY.-

"(1) FACILITY ASCERTAINING CAUSE OF DEATH.---If a victim described in subsection (a) dies at or before reaching the medical facility involved, and the medical facility receives a request under subsection (c), the medical facility shall provide a copy of the request to the medical facility ascertaining the cause of death of the victim, if such facility is a different medical facility than the facility that received the original request.

"(2) RESPONSIBILITY OF FACILITY.--Upon the receipt of a copy of a request for purposes of paragraph (11, the duties otherwise established in this subpart regarding medical facilities shall apply to the medical facility ascertaining the cause of death of the victim in the same manner and to the same extent as such duties apply to the medical facility originally receiving the request.

"(g) ASSISTANCE OF PUBLIC HEALTH OFFICER.-

"(1) EVALUATION OF RESPONSE OF MEDICAL FACILITY REGARDING INSUFFICIENT FACTS.---

"(A) In the case of a request under subsection (c) to which a medical facility has made the response specified in subsection (d)(4)(A) regarding the insufficiency of facts, the public health officer for the community in which the medical facility is located shall evaluate the request and the response, if the designated officer involved submits such documents to the officer with the request that the officer make such an evaluation.

"(B) As soon as is practicable after a public health officer receives a request under paragraph (1), but not later than 48 hours after receipt of the request, the public health officer shall complete the evaluation required in such paragraph and inform the designated officer of the results of the evaluation.

"(2) FINDINGS OF EVALUATION.-

"(A) If an evaluation under paragraph (1)(A) indicates that the facts provided to the medical facility pursuant to subsection (c) were sufficient for purposes of determinations under subsection (d)(1)-

"(i) the public health officer shall, on behalf of the designated officer involved, resubmit the request to the medical facility; and

"(ii) the medical facility shall provide to the designated officer the applicable response specified in subsection (d).

"(B) If an evaluation under paragraph (1)(A) indicates that the facts provided in the request to the medical facility were insufficient for purposes of determinations specified in subsection (c)---

"(i) the public health officer shall provide advice to the designated officer regarding the collection and description of appropriate facts; and

"(ii) if sufficient facts are obtained by the designated officer-

"(1) the public health officer shall, on behalf of the designated officer involved, resubmit. the request to the medical facility; and

"(II) the medical facility shall provide to the designated officer the appropriate response under subsection (c).

Health care facilities.
42 USC 300ff--84.

"SEC. SEC.2684. PROCEDURES FOR NOTIFICATION OF EXPOSURE.

"(a) CONTENTS OF NOTIFICATION TO OFFICER.--- In making a notification required under section 2682 or section 2683(d)(2), a medical facility shall provide-

"(1) the name of the infectious disease involved; and

"(2) the date on which the victim of the emergency involved was transported by emergency response employees to the medical facility involved.

"(b) MANNER OF NOTIFICATION.-If a notilication under section 2682 or section 2682(d)(2) is mailed or otherwise indirectly made-

"(1) the medical facility sending the notification shall, upon sending the notification, inform the designated officer to whom the notification is sent of the fact that the notification has been sent; and

"(2) such designated officer shall, not later than 10 days after being informed by the medical facility that the notification has been sent, inform such medical facility whether the designated officer has received the notification.

42 USC 300ff-85.

"SEC.2685. NOTIFICATION OF EMPLOYEE.

"(a) IN GENERAL.-After receiving a notification for purposes of section 2682 or 2683(d)(2), a designated officer of emergency response employees shall, to the extent practicable, immediately notify each of such employees who-

"(1) responded to the emergency involved; and

"(2) as indicated by guidelines developed by the Secretary, may have been exposed to an infectious disease.

"(b) CERTAIN CONTENTS OF NOTIFICATION TO EMPLOYEE.-A notification under this subsection to an emergency response employee shall inform the employee of-

"(1) the fact that the employee may have been exposed to an infectious disease and the name of the disease involved;

"(2) any action by the employee that, as indicated by guidelines developed by the Secretary, is medically appropriate; and

"(3) if medically appropriate under such criteria, the date of such emergency.

"(c) RESPONSES OTHER THAN NOTIFICATION OF EXPOSURE.--After receiving a response under paragraph (3) or (4) of subsection (d) of section 2683, or a response under subsection (g)(l) of such section, the designated officer for the employee shall, to the extent practicable, immediately inform the employee of the response.

"SEC. 2686. SELECTION OF DESIGNATED OFFICERS. 42 USC 300ff-86.

"(a) IN GENERAL.-For the purposes of receiving notifications and responses and making requests under this subpart on behalf of emergency response employees, the public health officer of each State shall designate 1 official or officer of each employer of emergency response employees in the State.

"(b) PREFERENCE IN MAKING DESIGNATIONS.-In making the designations required in subsection (a), a public health officer shall give preference to individuals who are trained in the provision of health care or in the control of infectious diseases.

"SEC. 2687. LIMITATIONS WITH RESPECT TO DUTIES OF MEDICAL FACILITIES. 42 USC 300ff-87.

"The duties established in this subpart for a medical facility-

"(l) shall apply only to medical information possessed by the facility during the period in which the facility is treating the victim for conditions arising from the emergency, or during the 60-day period beginning on the date on which the victim is transported by emergency response employees to the facility, whichever period expires first; and

"(2) shall not apply to any extent after the expiration of the 30-day period beginning on the expiration of the applicable period referred to in paragraph (l), except that. such duties shall apply with respect to any request under section 2683(c) received by a medical facility before the expiration of such 30-day period.

"SEC. 2688. RULES OF CONSTRUCTION. 42 USC 300ff-88.

"(a) LIABILITY OF MEDICAL FACILITIES AND DESIGNATED OFFICERS.-This subpart may not be construed to authorize any cause of action for damages or any civil penalty against any medical facility, or any designated officer, for failure to comply with the duties established in this subpart.

"(b) TESTING.--This subpart may not, with respect to victims of emergencies, be construed to authorize or require a medical facility to test any such victim for any infectious disease.

"(c) CONFIDENTIALITY.---This subpart may not be construed to authorize or require any medical facility, any designated officer of emergency response employees, or any such employee, to disclose identifying information with respect to a victim of an emergency or with respect to an emergency response employee.

"(d) FAILURE TO PROVIDE EMERGENCY SERVICES.--This subpart may not be construed to authorize any emergency response employee to fail to respond, or to deny services, to any victim of an emergency.

42 USC 300ff-89. **"SEC.2689.INJUNCTIONSREGARDING VIOLATION OF PROHIBITION.**

"(a) IN GENERAL.--The Secretary may, in any court of competent jurisdiction, commence a civil action for the purpose of obtaining temporary or permanent' injunctive relief with respect to any violation of this subpart.

"(b) FACILITATION OF INFORMATION ON VIOLATIONS.-The Secretary shall establish an administrative process for encouraging emergency response employees to provide information to the Secretary regarding violations of this subpart. As appropriate, the Secretary shall investigate alleged such violations and seek appropriate injunctive relief.

42 USC 300ff-90. **"SEC.2690. APPLICABILITY OF SUBPART.**

"This subpart shall not apply in a State if the chief executive officer of the State certifies to the Secretary that the law of the State is in substantial compliance with this subpart.".

42 USC 300ff-80 note. (b) EFFECTIVE DATE.-Sections 2680 and 2681 of part E of title XXVI of the Public Health Service Act, as added by subsection (a) of this section, shall take effect upon the date of the enactment of this Act. Such part shall otherwise take effect upon the expiration of the 30-day period beginning on the date on which the Secretary issues guidelines under section 2681(a).

APPENDIX C

SOURCES OF ADDITIONAL INFORMATION

SOURCES OF ADDITIONAL INFORMATION

FEDERAL

United States Fire Administration

- Office of Firefighter Health and Safety.
- Takes leadership role in providing infection control information to emergency services.
- Conducts forums on emergency response issues, such as communicable diseases.
- Sponsors teleconferences on infection control.
- Prepared the *Guide for Developing and Managing an Emergency Service Infection Control Program.*
- Works with other agencies and organizations in the development of standards, programs, and courses.

For more information, contact:

United States Fire Administration
Office of Firefighter Health & Safety
16825 South Seton Avenue
Emmitsburg, Maryland 21727

National Fire Academy

- Offering a two-day course entitled, *Infection Control for Emergency Response Personnel: The Supervisor's Role.*
- Integrating infection control information into applicable courses.

For more information, contact:

United States Fire Administration
National Fire Academy
16825 South Seton Avenue
Emmitsburg, Maryland 21727

- Learning Resource Center (LRC)

Emergency Management Institute

- Integrating infection control information into applicable courses.

For more information, contact:

Federal Emergency Management Agency
Emergency Management Institute
16825 South Seton Avenue
Emmitsburg, Maryland 21727

Centers for Disease Control

- Developed *Curriculum Guide for Public* Safety *and Emergency Response Workers.*
- Developed *Guidelines for the Prevention of Transmission of Human lmmunodeficiency Virus and Hepatitis B Virus to Health Care and Public Safety Workers.*
- Conducts ongoing research on infection control issues.
- Oversees the National AIDS Information Clearinghouse.

For more information, contact:

U.S. Department of Health & Human Services
Public Health Service, Centers for Disease Control
Atlanta, Georgia 30333

National Highway Traffic Safety Administration/Division of EMS

- Revising current EMT and Paramedic curricula to include infection control information.

For more information, contact:

National Highway Traffic Safety Administration
Division of EMS
Department of Transportation
400 7th Street, N.W.
Washington, D.C. 20590

Occupational Safety and Health Administration

- Enforces CDC guidelines through OSHA regulations. Specifically, 29 CFR Part 1910.1030, *Occupational Exposure to Bloodborne Pathogens; Final Rule* became effective on March 6, 1992.

For more information, contact:

U.S. Department of Labor
Occupational Health & Safety Administration
Office of Public Affairs, Room N-3647
200 Constitution Avenue, N.W.
Washington, DC. 20210

STATE

Public Health Agencies

- Liaison with CDC.
- Enforce use of CDC guidelines.

Fire and EMS Agencies

- Liaison with USFA and NFA.
- Sponsor training on infection control.

State OSHA (where applicable)

- Enforces OSHA regulations and CDC guidelines.
- Keeps statistics on occupational exposures, which will now include exposures to infectious diseases.

LOCAL

Public Health Agencies

- Liaison with state public health agencies.
- Screening, testing, evaluation, immunization, and treatment capabilities.
- Access to CISD professionals.

Regional EMS Agencies

- Liaison to state EMS agencies.

Hospitals

- Access to current information on infection control.
- Screening, testing, evaluation, immunization, and treatment capabilities.
- Notify emergency responders of possible exposure to infectious diseases.

Other Fire and EMS Departments

- May have infection control program in place that could be used as a guide.
- May have access to experts in infection control as it relates to emergency services.
- May have applicable data for justification or comparison purposes.
- May have additional infection control information.

NATIONAL ORGANIZATIONS

National Fire Protection Association

- Developed a video training package on infection control in the fire service.
- Developed NFPA 1581, *Standard for a Fire Department Infection Control Program.*
- incorporating infection control information in applicable NFPA standards.

For more information, contact:

National Fire Protection Association
Batterymarch Park
Quincy, Massachusetts 02269-9904
(800) 344-3555 (to order documents)

international Association of Firefighters

- Developed *Guidelines to Prevent Transmission of Communicable Diseases During Emergency* Care *for Firefighters, Paramedics, and EMTs.*
- Developed a poster on “Communicable Disease Warnings for Emergency Response Personnel.”

For more information, contact:

international Association of Fire Fighters
Department of Occupational Health & Safety
1750 New York Avenue, N.W.
Washington, D.C. 20006
(202) 737-8484

International Association of Fire Chiefs

- Promotes infection control policies and practices.

For more information, contact:

international Association of Fire Chiefs
1329 16th ST., N.W.
Washington, D.C. 20036
(202) 833-3420

National AIDS information Clearinghouse

- Provides information searches on HIV-related topics.

For more information, contact:

National AIDS information Clearinghouse
P.O. Box 6003
Rockville, Maryland 20850
(301) 762-5111

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